

# KENYA

## State of the Environment and Outlook 2010

*Supporting the Delivery of Vision 2030*

### Summary For Decision Makers



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# TABLE OF CONTENTS

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<b>FOREWORD</b> .....	i
<b>PREFACE</b> .....	ii
<b>ACKNOWLEDGEMENTS</b> .....	iii
<b>EDITORIAL AND PRODUCTION TEAM</b> .....	iv
<b>ACRONYMS</b> .....	v
<b>LIST OF FIGURES AND TABLES</b> .....	v
<b>INTRODUCTION</b> .....	1
<b>ANALYSIS</b> .....	2
Environment and economic development .....	2
Actionable Policy Options .....	5
Socio-economic status, poverty, gender and environment .....	7
Actionable Policy Options .....	9
Climate change and variability.....	12
Actionable Policy Options .....	13
Biodiversity .....	14
Actionable Policy Options .....	18
Forests and woodlands.....	18
Actionable Policy Options .....	23
Land, agriculture and livestock.....	23
Actionable Policy Options .....	28
Fresh water, coastal and marine resources.....	29
Fresh water.....	29
Coastal and Marine.....	30
Actionable Policy Options .....	32
Health and environment.....	33
Actionable Policy Options .....	35
Emerging issues .....	36
Actionable Policy Options .....	38
<b>REFERENCES</b> .....	39
<b>CONTRIBUTORS</b> .....	40

# FOREWORD

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The economy of Kenya and the livelihoods of her people largely depend on the utilization of her rich natural resource base. This resource base is increasingly under pressure from human activities, resulting in environmental degradation and depletion. The challenge, therefore, is to ensure sustainable use of our natural capital by striking a balance between its utilization and conservation.

State of the environment (SoE) reports are accepted worldwide as a means of reporting on environmental issues and progress made towards sustainable development. The 2010 SoE Report has been produced in fulfilment of Section 9(2)(p) of the Environmental Management and Coordination Act (EMCA) (Act No. 8 of 1999) which mandates the National Environment Management Authority (NEMA) to prepare annual State of the Environment reports for submission to the National Assembly. The SoE report is therefore an important tool for documenting timely, accurate and relevant information on various facets of the country's environment in order to ensure their sustainable use. More specifically, it provides a basis for efforts to restore environmental integrity and to tap the enormous opportunities which overwhelming environmental challenges such as climate change present.

The government acknowledges that a healthy environment is crucial to delivering Vision 2030, which is Kenya's long-term development blueprint and which is the theme of this SoE report. It has therefore instituted a number of measures to protect the environment. The most important of these is the promulgation of the 2010 Constitution which enshrines a series of environmental rights and provides for a number of environment-related laws. The executive arm of government and the National Assembly have initiated steps to establish the requisite commissions and to enact the environment-related laws stipulated by the new Constitution under the timelines outlined in its Fifth Schedule. In addition, a series of legal and policy responses have been crafted over the last two years to address the environmental challenges that the country is grappling with and include the National Climate Change Response Strategy, the Report of the Prime Minister's Task Force on the Conservation of the Mau Forest Complex and the Biosafety Act (No. 2 of 2009). It has also finalized a number of environmental regulations, standards and guidelines prepared under EMCA, which is the country's framework environmental law. On the regional front, in May 2010, Kenya signed the Nile Cooperative Framework Agreement which seeks to ensure more equitable and sustainable utilization of the waters of the Nile River Basin by the Nile Basin Countries.

The preparation of the 2010 SoE Report has been guided by the Drivers, Pressures, State, Impact and Response (DPSIR); and opportunities frameworks. These frameworks were selected

because of their potential to address the delicate nexus between environment and development, the impacts of human activities on the environment and crucially, the impacts of environmental changes on people's livelihoods. A participatory approach was also adopted in preparing the SoE report in recognition of the obvious benefits that accrue from drawing on the expertise of a broad base of stakeholders. Thus renowned Kenyan environmental experts were involved in the SoE process from the outset and were instrumental in selecting the report title and thematic areas, in drafting and providing substantive inputs to the chapters, and in validating the final report. Because this report is conceptualized and written by Kenyans, it documents the environmental challenges that our country is confronted with and the opportunities these present through a Kenyan lens in order to ensure both credibility and national ownership.

I would like to thank NEMA and the other lead agencies, the Ministry of Environment and Mineral Resources staff as well as other stakeholders which played various roles in preparing this publication. I also wish to express my profound gratitude to the Governments of Denmark and Sweden, which through the Danida/Sida supported Environmental Programme Support (EPS), funded the preparation and publication of this report. In addition, I wish to record my appreciation to the United Nations Environment Programme (UNEP) for its invaluable technical support.

I hope that this report will set us firmly on the path to realizing the ambitious goals enumerated under the economic, social and political pillars of Vision 2030 and I wish you all a happy reading.



A handwritten signature in black ink, appearing to read 'John Michuki'.

**Hon. John Michuki, EGH, MP**

Minister for Environment  
and Mineral Resources

# PREFACE

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Kenya's development is largely dependent on her natural resources' wealth. As such, periodic assessment of the state of the country's environment is an important step in the path to sustainable development. In accordance with the 1999 Environmental Management and Coordination Act (EMCA), the National Environment Management Authority (NEMA) is tasked with preparing annual State of the Environment (SoE) reports for submission to the National Assembly. It is hoped that this report – the seventh and most comprehensive yet – will enable us to better harness the enormous opportunities that our environment presents and to fill the knowledge gap on the magnitude of the environmental challenges that we have to continually confront.

The new Constitution, which was promulgated in August 2010, entrenches a number of environmental rights that are summed up under the overarching right to a clean and healthy environment which is provided for under Article 42. In addition, the Fifth Schedule specifies land, natural resources and the environment as some of the areas where a number of laws need to be enacted within 18 months to 5 years from the date of promulgation. The Constitution also provides for devolution of certain environmental mandates to the county governments where Kenyans at the grassroots can directly contribute to the protection of the environment and benefit from it through the devolved governance structures that will be gradually put in place.

The preparation of this SoE report was characterized by a participatory approach and a broad base of stakeholders was involved in the selection of the report title, the thematic areas and indicators as well as in data collection and compilation. The report was produced using the drivers, pressures, state, impact, and response (DPSIR), and the opportunities frameworks. These were selected because of their capacity to highlight the interlinkages between that state of the environment and the quality of development.

This report establishes an authoritative baseline for the attainment of Kenya's Vision 2030. The primary goal of the country's long-term development blueprint is to transform Kenya into a globally competitive and prosperous nation with its citizens enjoying a higher standard of living by 2030. It is

envisaged that this will translate into a higher proportion of Kenyans transitioning from crippling poverty. Vision 2030 aims to progressively realize these goals by implementing a number of five year medium-term rolling plans. Although environmental management is covered under the social pillar of Vision 2030, it is anticipated that this SoE report will act as a timely reminder that environmental integrity and economic development need not be a zero-sum game.

The information contained in this report is an invaluable resource for individuals, business entities, government ministries and agencies which are keen to contribute to the attainment of Vision 2030 in an environmentally sustainable manner. The report is also a useful resource for those who are looking to tap a range of opportunities offered by seemingly insurmountable environmental challenges such as climate change. The underlying message of this SoE report is that long-term development—such as that anticipated by Vision 2030—cannot be achieved without prioritizing environmental imperatives. It is therefore incumbent upon all Kenyans to value the environment as the “goose that lays the golden egg” and support its sustainable use for the benefit of present and future generations.



A handwritten signature in black ink, appearing to read 'Ali D. Mohamed'.

**Ali D. Mohamed, CBS**

Permanent Secretary, Ministry of  
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# ACKNOWLEDGEMENTS

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The process of preparing the 2010 State of the Environment (SoE) report was operationally supported by the Ministry of Environment and Mineral Resources and coordinated by a secretariat in NEMA which consisted of representatives from a number of lead agencies. These agencies played a crucial role in the development, validation and adoption of national environmental indicators and provided data and information which formed the basis of the chapters of the report. The lead agencies also helped to analyze and interpret the data, and to forecast a range of future environmental scenarios based on the trends that emerged from the analyses. I would therefore like to record my deep appreciation for the support that the Ministry of Environment and Mineral Resources rendered and the time and effort that the various agencies put into the preparation of this report.

I am also grateful to the Governments of Denmark and Sweden, which through the Danida/Sida supported Environmental Programme Support (EPS), funded the preparation and publication of this report. In addition, I am indebted to UNEP which provided technical backstopping for the development of the environmental indicators and which continued to provide advice throughout the entire report preparation process.

I would also like to thank the NEMA Board of Management for providing an enabling environment that made the completion of this report possible and to recognize the role played by the NEMA staff especially the Director, Planning and Research Coordination who oversaw the process of preparing this SoE report.

This report enumerates a number of emerging issues that need to be closely monitored to prevent them from evolving into intractable environmental crises. It is also hoped that the report findings will prompt the full spectrum of stakeholders to take timely action to remedy anthropogenic activities that degrade our environment. Therefore, while this report is an important reference tool, it is also intended to spur institutions and stakeholders into playing their rightful roles in environmental planning and monitoring, and in taking appropriate remedial action to restore environmental integrity.



A handwritten signature in black ink, appearing to read 'Ayub Macharia'. The signature is fluid and cursive.

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# ACRONYMS

ASALs	Arid and semi-arid lands	KSh	Kenya shilling
CCK	Communications Commission of Kenya	KWS	Kenya Wildlife Service
CDM	Clean Development Mechanism	MDG	Millennium Development Goals
CFAs	Community Forest Associations	MEMR	Ministry of Environment and Mineral Resources
CITES	Convention on International Trade in Endangered Species of Wild Flora and Fauna	MW	Megawatts
EMCA	Environmental Management and Coordination Act	NCCRS	National Climate Change Response Strategy
FAO	Food and Agriculture Organization	NEMA	National Environment Management Authority
GCF	Green Climate Fund	NGOs	Non Governmental Organizations
GDP	Gross Domestic Product	NIB	National Irrigation Board
GHGs	Greenhouse Gases	PPPs	Public-Private Partnerships
GMOs	Genetically Modified Organisms	REDD	Reducing Emissions from Deforestation and Forest Degradation
GoK	Government of Kenya	REP	Rural Electrification Programme
GWh	Gigawatt Hour	SDM	Summary for Decision Makers
IAEA	International Atomic Energy Agency	SEACOM	Sea Submarine Communications Limited
ICT	Information Communication Technology	SoE	State of the Environment
ICZM	Integrated Coastal Zone Management	TEAMS	The East African Marine System
IFAW	International Fund for Animal Welfare	UNDP	United Nations Development Programme
IPCC	Intergovernmental Panel on Climate Change	UNEP	United Nations Environment Programme
KFS	Kenya Forest Service	VAT	Value Added Tax

# LIST OF FIGURES AND TABLES

## Figures

Figure 1: Thematic overview of the Kenya Vision 2030 .....	1
Figure 2: Kenya's economic growth rates between 2004 and 2010.....	3
Figure 3: The geographic distribution of Kenya's power plants by category.....	6
Figure 4: Percentage of population living below the national poverty line.....	8
Figure 5: Trends of greenhouse gas emissions over the last 2000 years.....	12
Figure 6: Trend of Kenya's Grevy's zebra numbers from the late 1970s to 2007.....	14
Figure 7: Historical and current distribution of Grevy's Zebra .....	14
Figure 8: Kenya's forest reserves.....	19
Figure 9: Land classification in Kenya.....	24
Figure 10: Kenya's major crop growing areas.....	25
Figure 11: Water sector allocation as a percentage of GDP for the financial years 2003/4 – 2008/9.....	29
Figure 12: Trend of the amount of cargo handled by the Port of Mombasa .....	31
Figure 13: Cholera outbreaks by district, 2009 .....	34

## Tables

Table 1: Kenya's threatened mammal species and their habitat types.....	15
Table 2: Kenya's coastline at a glance.....	30
Table 3: Traffic handled at Mombasa Port, 2006-2010.....	31
Table 4: Kenya's progress on access to drinking water 1990-2008 .....	33
Table 5: Kenya's progress on access to sanitation from 1990-2008.....	33

# INTRODUCTION

The 2010 State of the Environment (SoE) report is produced pursuant to Section 9(2)(p) of the Environmental Management and Coordination Act (Act No. 8 of 1999) which mandates the National Environment Management Authority (NEMA) to prepare annual reports on Kenya's state of the environment for submission to the National Assembly.

This SoE Summary for Decision Makers (SDM) teases out the linkages between the current and projected state of Kenya's environment and economic development, socio-economic status, poverty, gender, health and the critical emerging issues as well as the associated opportunities and challenges for delivering Vision 2030, the country's long-term development blueprint. It also interrogates the ways in which the country's key environmental assets (biodiversity; forests and woodlands; land, agriculture and livestock; fresh water, coastal and marine resources) can be sustainably harnessed to attain the goals detailed in Vision 2030, which are illustrated

in Figure 1, and how the potential impediments can be overcome.

Each of the substantive sections of this SDM contains an overview of the state of that thematic area in 2010, a policy statement and recommendations. Each section then concludes by highlighting a series of actionable policy options.



Chyulu Hills

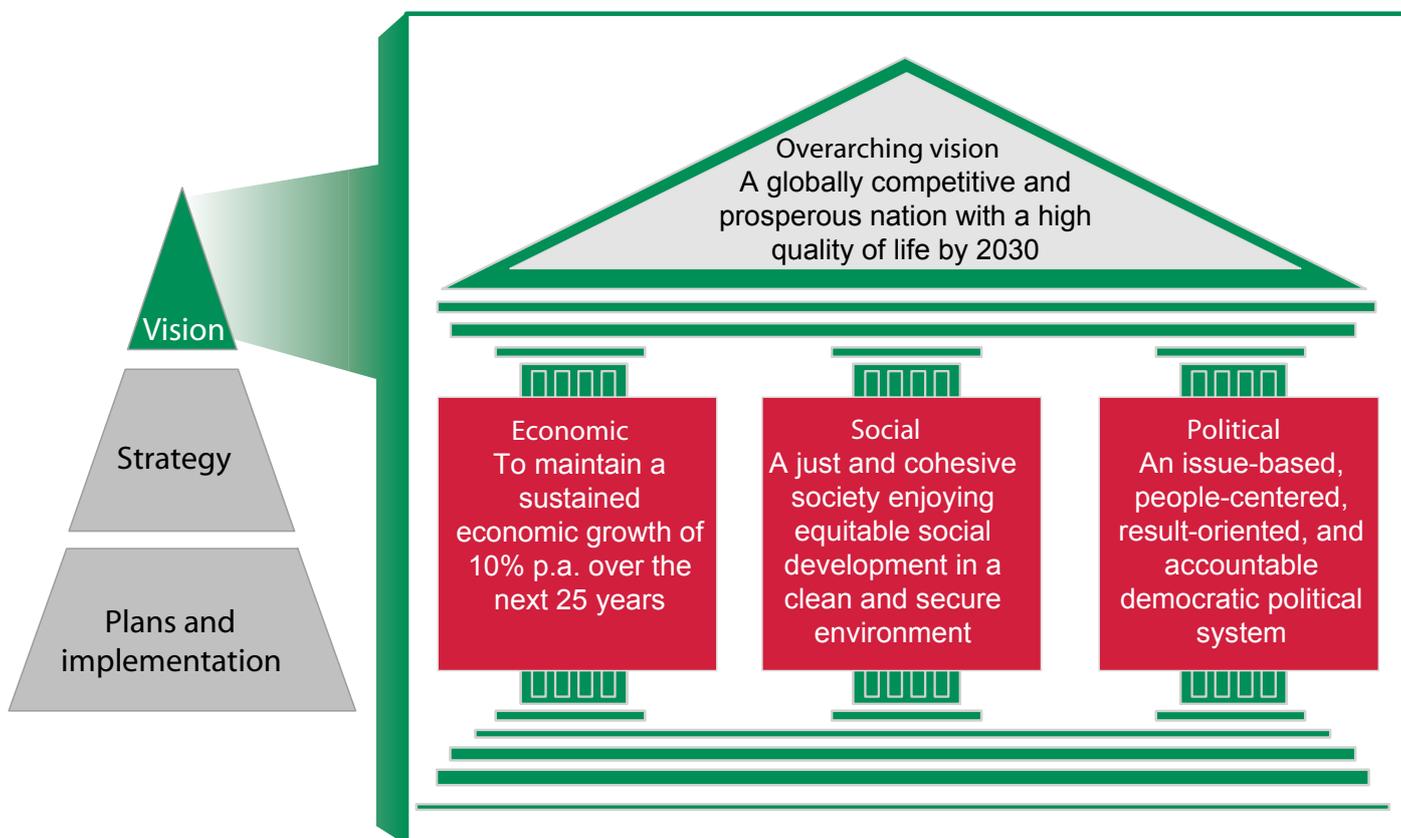


Figure 1: Thematic overview of the Kenya Vision 2030

GoK 2007

# THE ANALYSIS

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## Environment and economic development

Kenya's real GDP growth rate decelerated from 7.1 percent in 2007 to 1.7 percent in 2008, mainly on account of the 2008 post-election violence. It rebounded somewhat in 2009, registering a growth rate of 2.6 percent (GoK 2010g and GoK 2011) principally on the back of a cogent economic stimulus package and growth in some key sectors such as tourism, building and construction, telecommunications and fishing. The country's real GDP rate soared to 5.6 percent in 2010 due to macroeconomic stability, low inflation, increased credit to the private sector and better weather conditions (GoK 2011). Figure 2 sketches the country's growth rates between 2004-2010. While the 2010 impressive growth rate is a testament to the resilience of the Kenyan economy, it is still considerably lower than the 10 percent growth rate anticipated by Vision 2030 and continues to be weighed down by the sub-optimal performance of a number of important economic sectors.

- Agriculture recorded an impressive growth rate of 6.3 percent in 2010 (GoK 2011), recovering from a 2.7 percent contraction witnessed in 2009 and a 4.3 percent slump registered in 2008 chiefly because of poor weather conditions, the high cost of inputs and depressed international demand for Kenya's horticultural

produce. Because agriculture is the backbone of the economy and is pivotal to ensuring food security and to providing millions of Kenyans with a means of subsistence, higher growth rates are needed to set the country firmly on the path to actualizing Vision 2030. Further, declining sub-sectors such as coffee and horticulture are some of the country's biggest foreign exchange earners and are vital to cushioning the country against volatile international crude oil prices and rising prices of other important imports. The challenge will be to ensure that the country's forests, wetlands, marine resources and freshwater quality are not sacrificed in the pursuit of the increased agricultural production that will be necessary to accelerate the attainment of the Vision 2030 goals.

- Manufacturing grew at 4.4 percent in 2010—which was more than double the 2.0 percent growth rate recorded in 2009—because of good weather, which assured manufacturers of a steady supply of primary raw materials and hydro electric power. While good rains helped to prop up the sector, this is a striking illustration of the magnitude of the effect environmental stresses have over Kenya's economy. Indeed, the lower growth rate of 2.0 percent in 2009 was, in addition to cheap

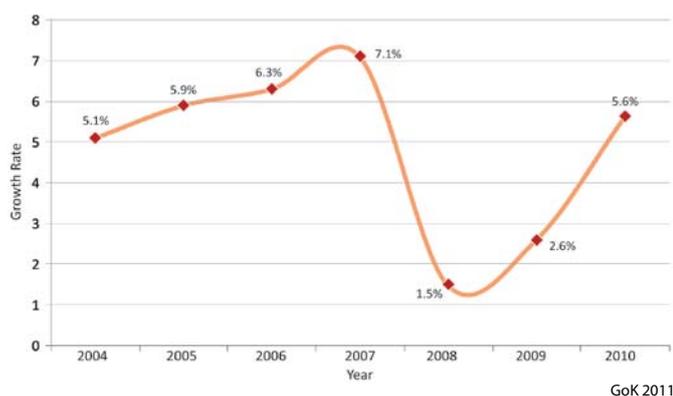
*Flamingos in Lake Nakuru*





Christian Lambrecht/UNEP

Tea Plantation in Nandi Hills



**Figure 2: Kenya's economic growth rates between 2004 and 2010**

imports and high production costs, primarily attributed to drought. In addition, although admittedly much improved, the country's manufacturing sector continues to exhibit a lukewarm performance as it continues to drag down the overall real GDP growth rate. Yet, because the sector is an important job and wealth creator, its sustained double-digit growth rate is crucial to directly meeting the targets enumerated in the Vision 2030 economic pillar and to consequentially attaining the ideals outlined in the social and political pillars. The sector is therefore expected to come under pressure to reassert its largely waning influence. However, without stringent regulatory and enforcement mechanisms, the sector could exacerbate environmental degradation. Major players in the sector have, for example, been implicated in the pollution of the country's rivers (UNEP 2007) into which they discharge untreated effluent.

- Growth in the country's transport and communications sector slowed from 6.4 percent in 2009 to 5.9 percent in 2010 (GoK 2011). The sector comprises the transport and storage, container handling at the port of Mombasa, air transport and the telecommunications sub-sectors which are fundamental to Kenya's economy and therefore to the attainment of Vision 2030. Because the dilapidated, century-old railway line is recording falling cargo hauling capacity, the burden is transferred to the country's road network, resulting in heavy traffic congestions, increased air pollution and the roads wearing out a lot faster. The telecommunications sub-sector exhibited a particularly strong expansion, with Kenya's mobile phone connections leaping from 12.9 million connections in 2008, 19.4 million subscribers in 2009 to 25 million connections as at December 31, 2010, resulting in a 63.2 percent mobile penetration, which was a significant increase over the 49.7 percent mobile penetration recorded at the end of 2009 (CCK 2011).

The sector is poised to expand further as industry competition intensifies with cheap handsets and the introduction of mobile number portability in 2011. Cheaper and faster internet access following the landing of The East African Marine System (TEAMS) and Sea Submarine Communications Limited (SEACOM) sea cables is also expected to continue driving demand for laptops and to grow Kenya's knowledge economy.

However, the ICT revolution has the potential to accentuate environmental degradation because of the absence of a regulatory regime for the safe disposal of the burgeoning electrical and electronic waste (e-waste). This is compounded by the fact that, despite being a signatory to both the Basel Convention on the Control of Transboundary Movements of Hazardous Wastes and Their Disposal; and the Bamako Convention on the Ban of the Import into Africa and the Control of Transboundary Movement and Management of Hazardous Wastes Within Africa, e-waste generated in developed countries is increasingly ending up in Kenya. This is because e-waste consignments are declared as functioning products (not waste), second-hand equipment or equipment for repair.

Moreover, the e-waste problem is likely to be compounded as Kenya migrates from analogue to digital terrestrial broadcasting technologies by 2012. Many Kenyans may be required to discard their analogue TV sets and invest in the new generation sets, resulting in colossal e-waste.

- Tourism was buoyed by higher tourist arrivals on the back of diversified marketing in new source markets in Asia, with earnings rising by 17.9 percent from KSh 62.5 billion in 2009 to KSh 73.7 billion in 2010 (GoK 2011). While Kenya's unique and diverse wildlife and landscapes have the potential to become the engine of the 10 percent annual economic growth rate anticipated by Vision 2030, there is need to assuage the relevant environmental pressures as soaring tourism is invariably associated with a range of environmental disturbances especially during the critical breeding and migration seasons.

**Policy message:** Numerous intricate feedbacks exist between the environment and Kenya's economy. Rural livelihoods and the production that stimulates economic growth are dependent on extraction or use of natural resources and ecosystem services as well as waste disposal into the environment. However, excessive harvesting could lead to resources' depletion while the accumulation of waste and pollutants could overwhelm the environment's carrying capacity, aggravating environmental degradation and imperilling the citizens' well-being and the country's economic development.

**Recommendation:** Institute a regulatory framework for management of e-waste and compel industries that generate e-waste, such as manufacturers and distributors of electrical and electronic equipment to establish take-back programmes and, offer fiscal incentives to encourage entire lifecycle e-waste handling encompassing the transportation, sorting, fraction recovery and disposal stages.

- The construction sector's growth declined from 12.4 percent in 2009 to 4.5 percent in 2010. The upsurge in building and construction in 2009 had mainly been attributed to the extensive overhaul of the country's road network and a boom in the development of residential and commercial buildings. This obviously augured well for the realization of Vision 2030 because modern physical infrastructure and decent and affordable shelter are indispensable to the country's

**Recommendation:** To gradually ease the disruptions to wildlife which is already threatened by severe droughts, floods and human settlement, the thrust of the government's marketing strategies should be to tap the domestic ecotourism niche and to reposition Kenya as a premium destination for high-spending tourists and the largely wildlife-neutral but lucrative conference tourism.

economic development, spur cement production, create jobs and boost loans and mortgages. Efforts to revitalize the real estate industry by expanding the areas to which fiscal incentives for large-scale affordable housing apply should be instituted. However, owing to its sheer size, the construction industry isn't just one of the largest users of material, water and energy resources, it is also a momentous air, water and noise polluter.

**Recommendation:** Contractors and the general citizenry should be sensitized on the merits of constructing energy-efficient buildings and developing physical infrastructure using a suite of environmentally sustainable materials and construction standards.

- Fishing, predominantly from the country's freshwater bodies, raked in KSh 17.7 billion in 2010, up from KSh 13 billion earned in 2009, largely on account of higher catches and better domestic and export prices (GoK 2011). Fishing is a major source of livelihood for communities which live near the Victoria, Turkana and Naivasha lakes, Tana River and Indian Ocean. Freshwater fishing is complemented by the growing importance of aquaculture. In 2010 alone, 20 000 fish ponds were constructed in 160 constituencies under the Economic Stimulus Package. Nevertheless, agrochemical runoff and disposal of industrial and medical waste which result in eutrophication (Odada 2004) as well as the jurisdictional impasse over the tilapia and Nile perch-teeming waters surrounding the Migingo Island appear to be undermining the sustainability of the sector around Lake Victoria. Abusive fishing practices, such as using pesticide-laden baits (Henry and Kishimba 2006) have also raised questions over the sanitary quality of the fish. Moreover, the water paucity that Kenya is experiencing is likely to further test the resilience of freshwater fishing.

- Hydroelectric power, principally generated by the Gitaru, Kiambere, Turkwell, Kindaruma and Masinga power plants which have a combined installed capacity of 555MW, has traditionally accounted for the preponderance of Kenya's energy and represented 56.8 percent and 50.6 percent of all the power generated in 2007 and 2008 respectively. However, because of acute drought, production plummeted by 35 percent from 3 267.0 GWh in 2008 to 2 160.0 GWh in 2009, when it constituted only 33.2 percent of the country's energy portfolio and was dislodged by thermal oil power, which accounted for 46.3 percent of the power generated, as the leading source of energy.

In 2010 however, hydro power reclaimed its position and accounted for 46.2 percent of the power generated while the comparable figure for thermal oil was 37.1 percent (GoK 2011). Figure 3 contains the geographic distribution of Kenya's power plants by category. Energy is a major catalyst for Kenya's economic progress and qualitative development. However, even though hydro power is considered to be a cleaner source of energy than its thermal oil counterpart, its reliance on the vagaries of weather has often led to power rationing and rising electricity bills, putting it out of the



Wind power generation in Ngong hills

reach of many Kenyans and essentially hindering implementation of the rural electrification programme (REP). And, because thermal oil power plants generate electricity by burning large amounts of fossil fuels, they are formidable emitters of greenhouse gases (GHGs) that are responsible for the climate variability that the world is grappling with and particulates which, in addition to causing a range of pulmonary diseases, are notorious carcinogens.

**Recommendation:** *It is important for Kenya to reduce her reliance on both hydroelectric and thermal power by developing untapped potentials in geothermal, solar and wind energy. The government should also offer attractive fiscal incentives, such as exempting equipment purchases from VAT, in order to encourage rural and urban households to reduce their dependence on the national grid by investing in cleaner, renewable sources of energy such as solar, wind and biogas.*

### Actionable Policy Options

- Mainstream environmental concerns by:
  - Formulating a national environment policy which would provide the policy framework on which sectoral environmental policies and laws and their harmonization would be anchored. The national

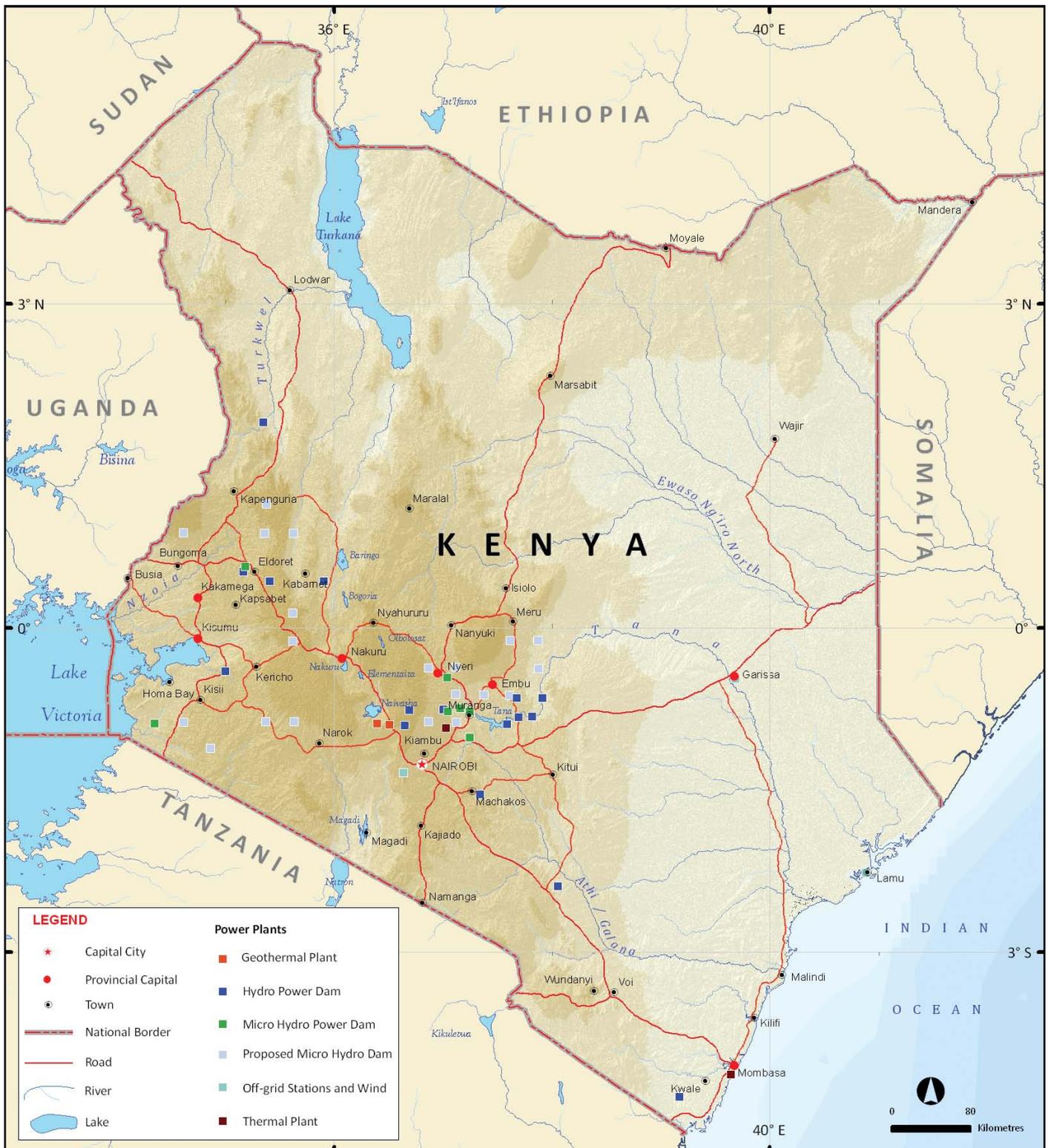


Figure 3: The geographic distribution of Kenya's power plants by category

KENGEN 2011

policy would also provide a basis for strengthening linkages between institutions that have environment-related mandates.

- Integrating environmental objectives into the development plans, policies and decisions of national and county governments and quasi-government institutions as well as the investment decisions of private sector actors (Dalal-Clayton

and Bass 2009). This is especially important given that sustainable use of Kenya's natural resources and environmental assets are integral to alleviating poverty and delivering the economic and human welfare targets outlined in Vision 2030. For it to achieve the desired outcomes, environmental mainstreaming would, of course, need to be matched with higher budgetary allocations but

also with utilizing a range of environment-specific initiatives such as banning the use of plastic bags in shopping outlets, REDD-plus and its affiliated Forest Carbon Partnership Facility.

- Institute a range of fiscal measures to reward environment-friendly initiatives such as those promoting green technology and discourage activities that are notorious for degrading the environment by rigorously applying the 'polluter pays' principle.
- Effect a statutory amendment that would ensure that the national accounting system embraces environmental accounting because traditional financial accounting methods typically underestimate the country's natural capital and therefore the natural resource and environmental costs of economic activity (Burnett and Hansen 2008). From a regulatory perspective, environmental accounting would enable Kenya businesses to better internalize their externalities,

incrementally leading to less water and air pollution, deforestation and general land degradation. Moreover, because the wider ambit of accounting would minimize environmental risks and hazards and enable businesses to track environmentally significant expenditures—such as those relating to decreasing waste generated (through reducing, reusing, recovering and recycling) and GHG emissions, as well as conserving water, energy and using cheaper, renewable energy—it makes tremendous business sense.

- Encourage consumers, through sensitization campaigns, to opt for eco-friendly products rather than basing their buying decisions solely on price sensitivity and brand loyalty. This will gradually increase public scrutiny on the environmental friendliness of production processes and the ecological impacts of products will persuade business entities to develop environmentally sound business norms.

## **Socio-economic status, poverty, gender and environment**

There is ample proof of the interlinkages between socio-economic status and the environment:

- Kenyans who occupy the bottom rung of the socio-economic hierarchy heavily rely on the natural environment for their subsistence needs such as food and wood fuel and are more likely to exert extraordinary pressure on it. Further, hazardous landfills and incinerators are predominantly located in deprived neighbourhoods with the corollary that the residents are disproportionately affected by the resultant adverse health and environmental impacts.
- Conversely, those who enjoy a privileged socio-economic status are more likely to display insatiable consumption patterns which inevitably put a strain on the country's environmental resources and generate a lot of waste, which is then dumped in the poor neighbourhoods. As such, even though elite Kenyans are the chief contributors of environmental degradation, their high-end locales are ironically generally lush, immaculate and pollution-free.

The poverty-environment nexus is a complex, mutually reinforcing one and is particularly relevant to Kenya which is characterized by rising income inequality, with a significant 46.6 percent of the population currently living below the national poverty line (UNDP 2010). See Figure 4 for the percentage of Kenyans living below the poverty line in the various regions of the country. Poverty exacerbates environmental degradation in Kenya in a number of ways:

- It forces poor people to overexploit open-access natural resources which have little or no effective state or private regulation.
- It compels the poor to inhabit or cultivate ecologically fragile landscapes such as forests, wetlands, lakeshores, hillsides and animal migration corridors, with disastrous consequences for biodiversity and ecosystems.
- It constrains the government and deprived communities to privilege short-term economic growth over environmental concerns.

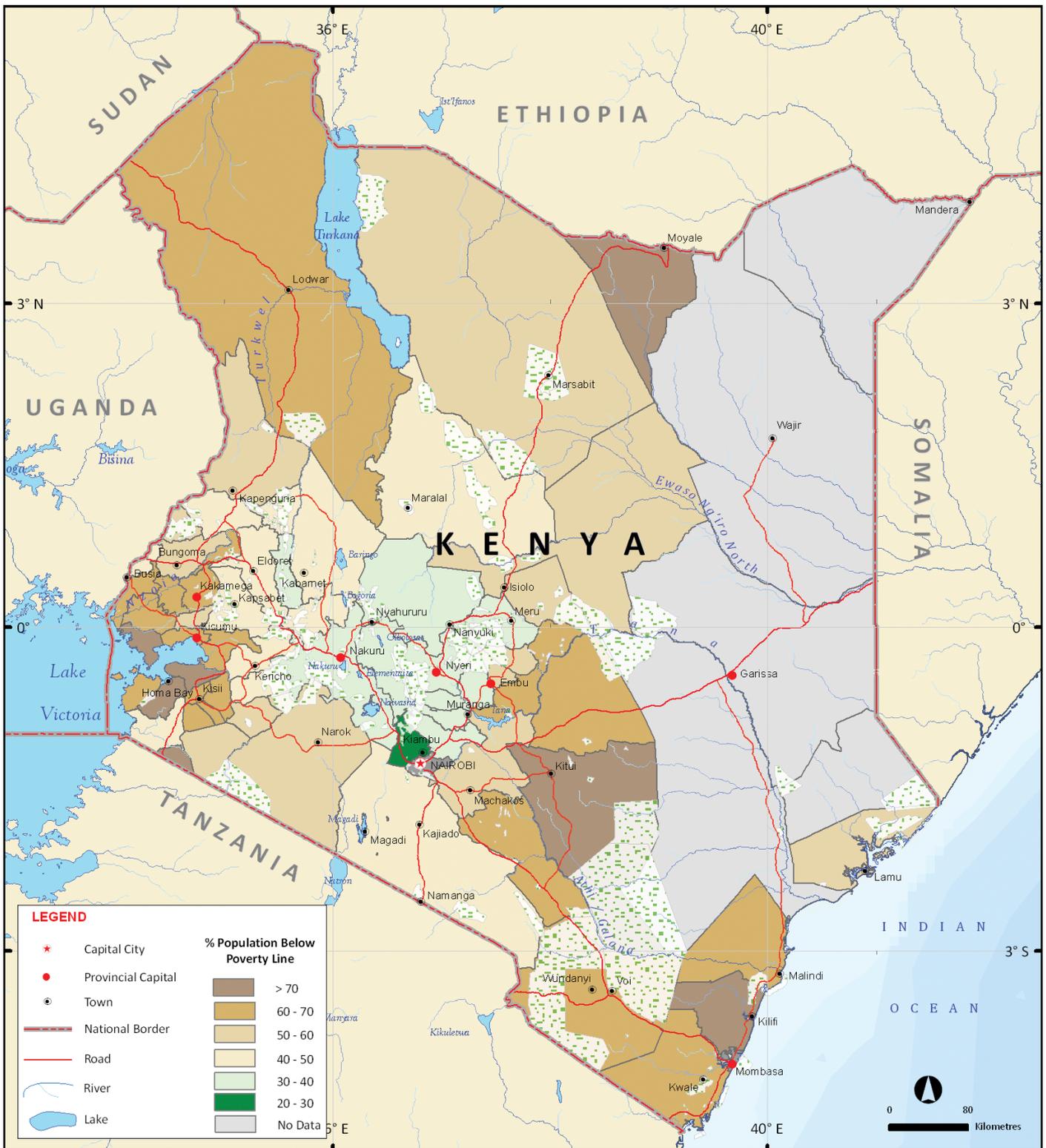


Figure 4: Percentage of population living below the national poverty line

World Bank n.d.

On the flipside, environmental degradation compounds poverty in a number of ways:

- Disadvantaged sections of society are forced to occupy marginal rural lands or hazardous urban neighbourhoods and are consequently exposed to diseases with environmentally-mediated triggers such as asthma while those who live near landfills such as Dandora in Nairobi and Mwakirunge in Mombasa are predisposed to unfavourable conception outcomes such as

miscarriages, stillbirths, congenital anomalies, low birth weight as well as organ cancers and leukemia.

- It disproportionately impacts the poor and aggravates their vulnerability to natural disasters as they already live in squalor and only possess a limited repertoire of coping capacity. As such, deterioration of the environment further enmeshes the indigent in the poverty trap.

Gender refers to the socially constructed characteristics of men and women with societal meanings ascribed to maleness and femaleness constituting gender identity and determining gender roles. Although women comprise 50.3 percent of Kenya's population (GoK 2010f):

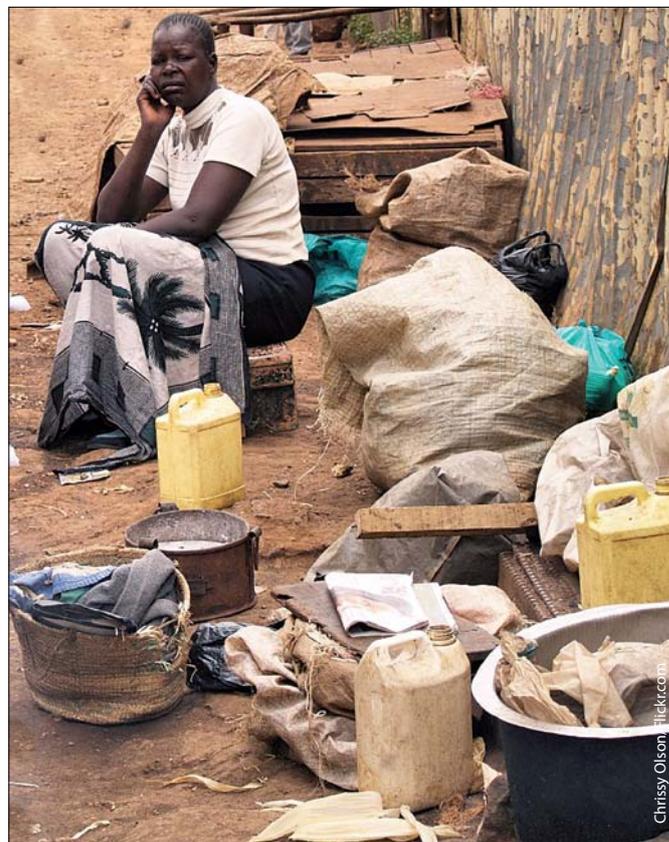
- they have to continually negotiate highly oppressive cultures with the effect that many of them face exclusion from the public and economic spheres.
- they carry an inordinate work burden and because their role as providers of family food, fuel and water brings them into close contact with the environment, they are disproportionately affected by eco-crises.

**Policy message:** *There is a correlation between socio-economic status, poverty and gender on the one hand and the environment on the other, particularly for those at the intersection of these identity markers. Raising the participation of the marginalized in all economic, social and political decision making processes through education and improved access to basic healthcare and environmental resources would lead to more sustainable management of the environment and ultimately, to the delivery of Vision 2030.*

**Recommendation:** *The important, different but complementary roles of women and men in sustainable management of the environment calls for gender mainstreaming in environment governance, programme design, implementation, monitoring and evaluation. For these reasons, and given the devolved governance system that Kenya is transitioning to, every agency and Ministry responsible for managing the environment should be allocated sufficient funds to support implementation of the related action plans.*

### Actionable Policy Options

- Mainstream poverty-environment interlinkages into national and county development planning, policymaking, budgeting, programme implementation and monitoring through financial and technical assistance (Drakenberg et al 2009) and scale up the capacity of public institutions to address detrimental



A women sitting next to her belongings in the Kibera informal settlement in Nairobi

manifestations of the nexus between the two variables.

- Articulate the link between restoring degraded environments and reducing poverty as sustainable use of natural resources can provide a range of income-generating opportunities for Kenya's poor households (UNDP and UNEP (2008b) and spur the formation of small and medium sized enterprises that can enable the entrepreneurs and employees to break the intergenerational poverty cycle. In addition, incentives should be put in place to encourage children from poor and minority communities to attend school as education strengthens employment prospects (Garcia and Fares 2008) and offers these groups the surest way out of the crippling poverty trap.
- Mainstream gender considerations into the formulation and implementation of development plans and laws. Institutionalizing gender analysis and equity principles into these policies, plans and programmes would take due cognizance of the contributions, potentials and priorities of women, men, girls and boys. Further, gender mainstreaming would gradually alter stereotypes about the role of women, increase their decision-making power in environmental matters and improve their capacity to tackle environmental degradation.



**Nairobi River Clean Up:** The Nairobi River Basin comprises a complex of streams that flow eastwards. The Nairobi River, which flows through the Central Business District, is the basin's main river while the Ngong and Mathare Rivers are its main tributaries. This river basin is faced with a myriad of environmental problems which include rapid urbanization, industrialization, poor urban planning and weak enforcement of environmental laws. As such, untreated effluent, raw sewage

and solid waste from industrial and domestic sources drain into the river, causing serious environmental degradation.

In a bid to reverse the above environmental problems, the Government of Kenya created the Nairobi River Basin Programme that aims to enhance the ecological integrity and socio-economic value of the river basin. The Programme interventions focus on four key themes namely: environmental



education, awareness creation and public communication; conservation of the riparian reserve; integrated waste management; and the restoration of the Nairobi Dam.

These two images show the section of the Nairobi River between Kijabe Street and the Globe Cinema roundabout. Waste has been physically removed from the area marked with

yellow arrows and the section converted to a public recreation park. It is envisaged that such success stories will be gradually replicated throughout the river basin.

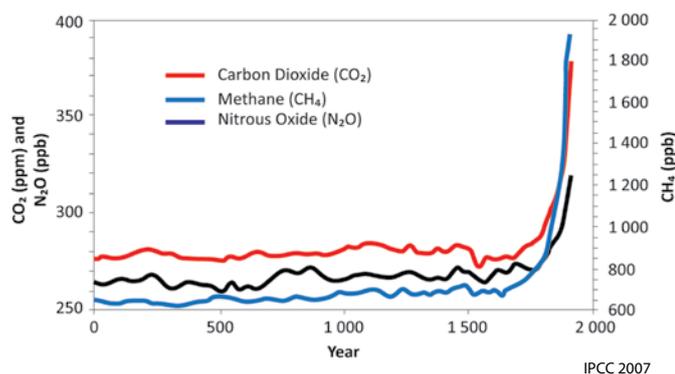
## Climate change and variability

The symptoms of climate change in Kenya include:

- Rising ambient temperatures that are consistent with global warming (depicted in Figure 5), the receding Mount Kenya glaciers, severe floods and droughts particularly those associated with the El Niño-Southern Oscillation climate pattern, surface water and ocean warming, rising sea levels and coral bleaching.
- Expanding habitat ranges of crop, livestock and human disease vectors. So Kenya is experiencing a resurgence of malaria, yellow fever, dengue and trypanosomiasis (sleeping sickness) as rising temperatures encourage breeding of their respective carriers, the anopheles mosquito and tsetse fly in larger zones.
- Increasing incidence of water-borne diseases such as schistosomiasis (bilharzia) and cholera (GoK 2010a) as well as pulmonary illnesses owing to increased emissions of particulates that result from rising fossil fuel use.

Although there is little reference to climate change in Vision 2030, there is need to urgently institute effective mitigation and adaptation mechanisms if Kenya is to remain on course to meeting the targets specified in the long-term development plan:

- The higher prevalence of tropical, water-borne and pulmonary diseases is bound to lead to higher rates of mortality and morbidity which will directly affect the citizens' productivity. It could also place additional burdens the country's health services which are already stretched by HIV/AIDS and call for even higher budgetary allocations for these services, effectively channelling money away from the country's productive sectors.
- Unpredictable weather patterns characterized by low, erratic rainfall and prolonged drought and an increased incidence of pests and diseases are likely to disrupt planting patterns and reduce crop yields and livestock



**Figure 5: Trends of greenhouse gas emissions over the last 2000 years.**

productivity, exacerbating food insecurity and malnutrition.

- Water paucity is also projected to worsen, compounding the already heavy burden on women and marginalized sections of society who will have to walk even farther in search of the increasingly scarce commodity.
- Water surfeit, emanating from more frequent and severe floods such as those which have traditionally inundated Budalangi, may lead to the loss of life and property, displacement of people, environmental degradation and disruption of economic activities.
- Climate change will also unfavourably alter the taxonomic composition of forests, aggravate biodiversity loss and endanger biotic interactions and the essential ecosystem services these natural resources provide. There is also the prospect of climate variability fomenting conflict as the scramble for progressively scarcer natural resources intensifies.

**Policy message:** *Although climate change and its negative effects cannot be fully discerned, as is the case with the rest of the world, there is consensus that Kenya is experiencing an unparalleled escalation of the incidence and enormity of intense climatic events. Therefore, unless effective mitigation and adaptation mechanisms are urgently instituted, climate change-induced impacts will slow or even inhibit the accomplishment of the Vision 2030 goals.*

**Recommendation:** *Because climate change is arguably the defining environmental challenge of our time, it poses serious threats to Kenya's sustainable development. Indeed, it is projected that the phenomenon could cost African countries in excess of 20 percent of GDP per year by 2100. Cognizant of this, Kenya should formulate a national climate change policy and action plan and fast-track enactment of a climate change law in order to build on the momentum started by the National Climate Change Response Strategy (NCCRS) which provides a roadmap for integrating a series of mitigation and adaptation measures in all the government planning and budgeting processes in order to strengthen Kenya's climate change-resilience.*



Flooded house in Mtwapa

**Policy message:** *Despite the overwhelmingly negative prognosis on climate change, it in fact provides a range of unique and potentially lucrative opportunities that can be harnessed to accomplish the Vision 2030 goals. One of these relates to carbon trading as the considerable revenue generated can be used to fund conservation and development projects.*

**Recommendation:** *Kenya should move quickly to establish a regional carbon emissions trading hub and gain first-mover advantage over her regional neighbours. The revenue generated from this could be used to fund a range of climate change mitigation efforts such as those related to afforestation and reforestation. These proceeds could also be used to finance adaptation mechanisms that are tailored to meet the specific needs of local communities.*

### Actionable Policy Options

- Formulate a comprehensive national climate change policy and action plan and enact a climate change law. Both should broadly enunciate the notions of mitigation and adaptation.

- Integrate climate change considerations as well as mitigation and adaptation measures into national and county development plans because climate change has far-reaching environmental, economic, social and health consequences and has the potential to reverse any gains made towards delivering Vision 2030.
- Study and document the manifestations of climate change in Kenya, the attendant vulnerability assessments and their impacts on the country's natural and man-made capital in order to establish baselines.
- Establish a carbon credit investment policy and legal framework in order to stimulate the establishment and growth of carbon emissions trading schemes. Timely finalization of these issues could enable Kenya to develop into the regional emissions trading hub and reap the benefits that are attendant to 'first mover' status.
- Strategically position the country to leverage the enormous opportunities offered by a range of climate change mitigations and adaptation mechanisms such as the CDM, the embryonic US\$ 100 billion dollar Green Climate Fund (GCF) and carbon trading through capacity building and a demonstrable commitment to tackling climate change.

## Biodiversity

Although precise data are lacking, the country's biodiversity treasure trove is estimated to contain at least 315 mammal, 1 133 avifauna, 191 reptile, 88 amphibians, 872 fish, 25 000 invertebrate, 21 575 insect, 2 000 fungi and bacteria, and 7 000 plant species (NEMA 2009). The rich biodiversity is primarily attributable to variable climate conditions and topology across space which generate diverse habitats and ecosystems. The country's biological resources are a source of food, herbal medicine, housing materials, wood fuel as well as spiritual nourishment and support economic activities in the agriculture, energy and tourism sectors. The ecosystem diversity provides a series of services such as water and air purification, soil erosion control, flood and storm mitigation, groundwater recharge and climate regulation.

Threats to Kenya's biodiversity include habitat destruction, human-wildlife conflicts, invasive alien species which prey on their indigenous counterparts or outmanoeuvre them in the race for food, water or light. Further, pollution, an unsustainable rise in the human population which clears biodiversity habitats or wildlife corridors for agriculture and settlement, overexploitation by harvesting resources at a much faster pace than they can regenerate and biopiracy also pose considerable challenges. The situation has been compounded by lack of a comprehensive biodiversity policy and weak enforcement of existing laws and regulations.

**Policy message:** Kenya is a rich repository of ecosystem and wildlife biodiversity as the country is home to a large number of aquatic and terrestrial flora and fauna species, many of which are endemic to the country and which meet multifarious ecological, economic and cultural needs.

**Recommendation:** Given the irreplaceable role of biodiversity, there is need to conduct, document and periodically update the country's biodiversity inventory using state-of-the-art tools and techniques such as remote sensing and geographic information systems (GIS). During the inventorying stage intervals, biodiversity should be monitored in order to assess the efficacy of the conservation efforts and to avert threatened species' extinctions.

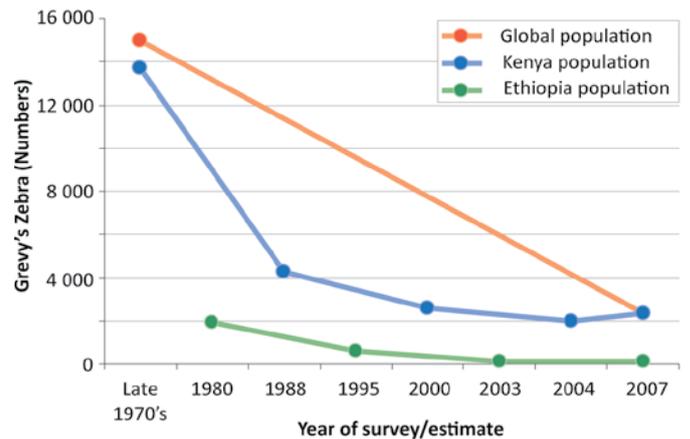


Figure 6: Trend of Kenya's Grevy's zebra numbers from the late 1970s to 2007

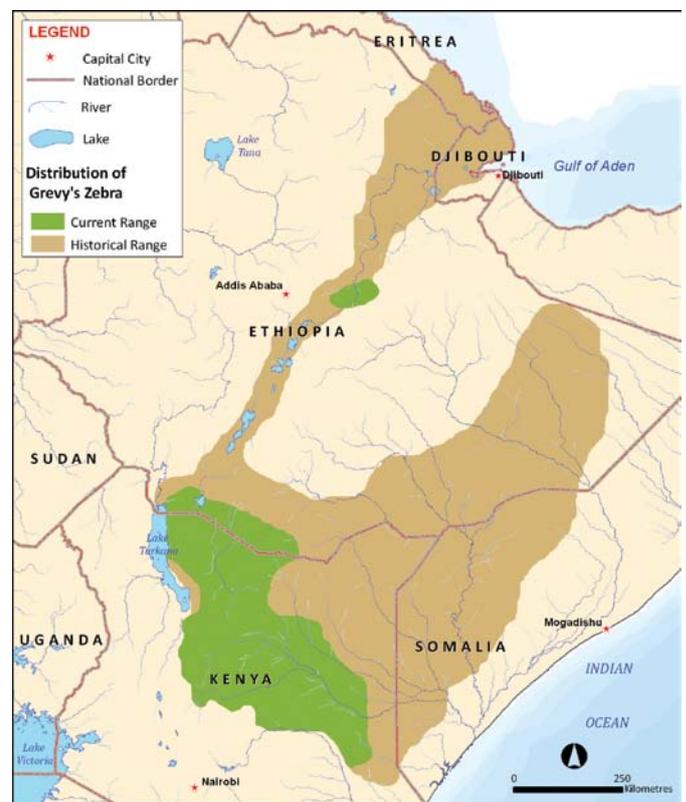


Figure 7: Historical and current distribution of Grevy's Zebra

As a result of multifaceted pressures, many of the country's recorded fauna and flora species are threatened or endangered. Table 1 contains a list of Kenya's threatened mammal species and their habitat types. The most poignant of these instances is the black and white rhinoceroses which, despite being listed in Appendix I of the Convention on International Trade in Endangered Species of Wild Flora and Fauna (CITES) which accords them special protection, had been poached to near extinction in Party States including Kenya. This prompted the establishment of the Ngulia Rhino Sanctuary in Tsavo West National Park where the rhinos are tagged and kept under close surveillance. The movement of these

**Policy message:** Despite its critical, incomparable role, Kenya's biodiversity continues to confront severe threats and unless urgent measures are instituted to stem this worrisome tide, much of the country's biodiversity might soon reach the tipping point. It is especially important to address the threat of biopiracy and to set out a comprehensive regulatory regime on bio-prospecting, benefit sharing and respect for indigenous knowledge.

**Policy message:** Kenya has recorded a number of success stories in saving endangered biodiversity. The lessons from these should be documented as best practices and scaled up in order to save severely endangered plant and animal species.

**Recommendation:** Develop a comprehensive national policy and law on biodiversity. In its quest to ensure sustainable use of the country's biological resources, these should provide for access by local communities and seek to regulate research and bio-prospecting and provide for equitable benefit-sharing of bio-prospecting endeavours in accordance with the provisions of the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological.

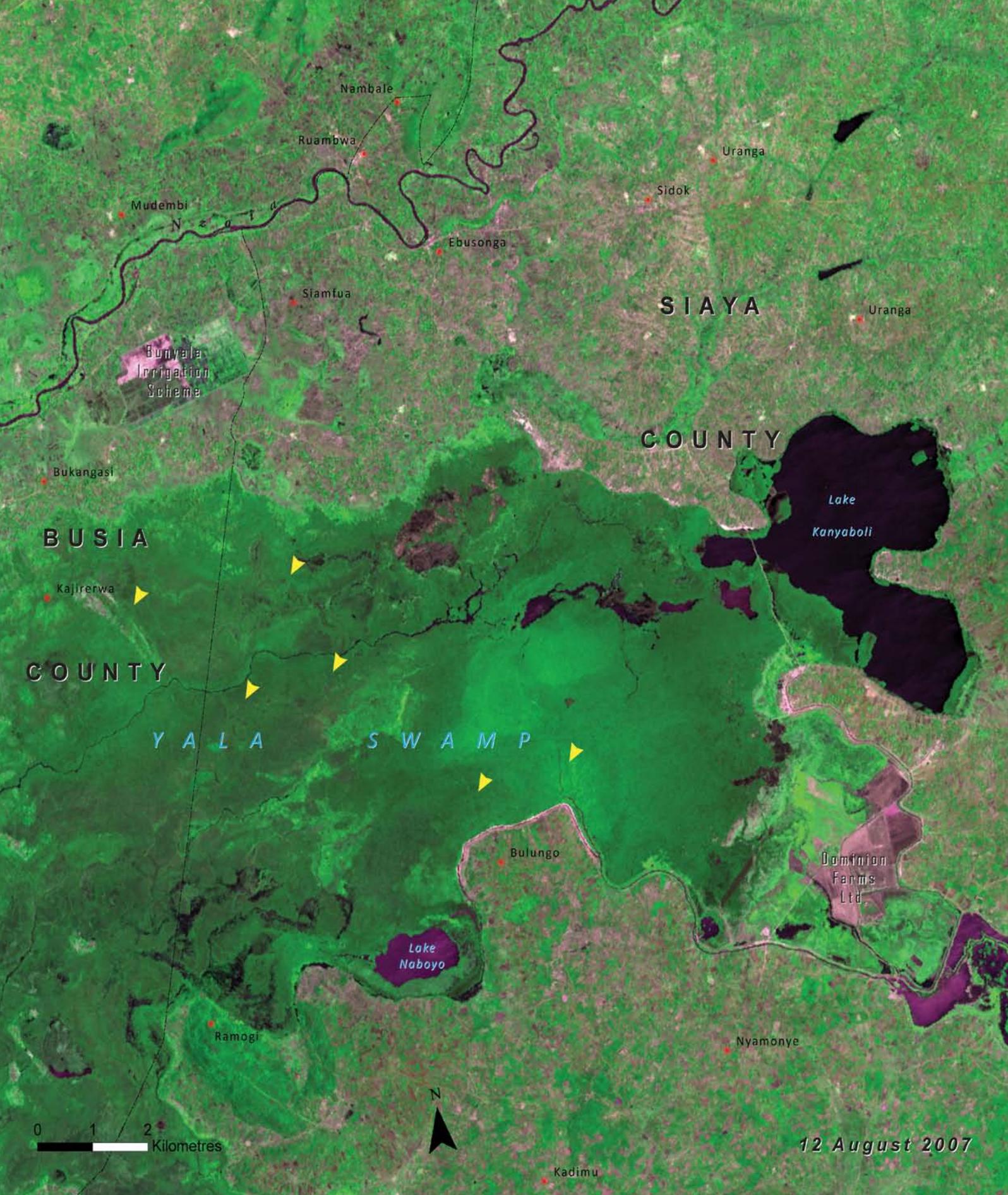
endangered herbivores is also closely monitored in the Lake Nakuru and Nairobi National Parks, which collectively host the country's largest non-private rhinoceros population. Moreover, the buffalo, Rothschild giraffe, Burchell's zebra, topi, oryx, eland, waterbuck, kudus, gerenuk, impala, Grant's and Thomson gazelle, warthog and ostrich populations declined in Kenya's rangelands in 2009 (GOK 2010g). Figure 6 depicts the trend of Kenya's

Grevy's zebra numbers from the late 1970s to 2007 while Figure 7 contrasts the historical and current distribution of Grevy's Zebra. Kenya is, in addition, home to at least 99 endangered tree species which include *Euphorbia tanaensis*, *Dalbergia vacciniifolia* and brown mahogany (*Lovoa swynnertonii*). There are some success stories however. The African elephant in the vast coterminous Tsavo national parks which host about one third of the country's elephants, weathered a severe drought and a rise in poaching incidents—to feed a thriving illegal trade in ivory after South Africa, Botswana, Namibia and Zimbabwe were allowed to sell off their ivory stockpile

**Table 1: Kenya's threatened mammal species and their habitat types**

KWS 2010

Common name	Scientific name	Habitat
Black rhinoceros	<i>Diceros bicornis</i>	Woodlands
White rhino	<i>Ceratotherium simum simum</i>	Wooded grassland
Hirola	<i>Beatragus hunter</i>	Woodlands
Tana crested mangabey	<i>Cercocebus galeritus</i>	Gallery forest
Roan antelope	<i>Hippotragus equines</i>	Wooded grasslands
Sable antelope	<i>Hippotragus niger</i>	Upland grasslands
Grevy's zebra	<i>Equus grevyi</i>	Wooded grasslands
African elephant	<i>Loxodonta africana</i>	Woodlands and forests
Eastern bongo	<i>Tragelaphus eurycerus isaaci</i>	Montane Forests
African lion	<i>Panthera leo</i>	Wooded grasslands
Leopard	<i>Panthera pardus</i>	Woodlands
Cheetah	<i>Acinonyx jubatus</i>	Open grasslands
Sitatunga	<i>Tragelaphus spekii</i>	Freshwater swamps
Rothschild's giraffe	<i>Giraffacamelopardalis rothschildi</i>	Woodlands



**DESTRUCTION of YALA SWAMP:** Yala Swamp, the third largest of Kenya's wetlands, is situated on the deltaic sediments of the Nzoia and Yala Rivers at the point at which they enter the northeastern corner of Lake Victoria. The swamp's vegetation consists of papyrus, phragmites and

typha. The wetland is a vital habitat for many birds and several fish species which were displaced from the main body of Lake Victoria upon the introduction of the predatory Nile Perch. The swamp also filters sediments, nutrients and pollutants from the waters entering Lake Victoria from the



Nzoia and Yala River catchments. Sustained drainage of the swamp since the 1960s in order to pave way for agriculture has led to a loss of 17 500 ha. The images above illustrate the dramatic destruction of the wetland's vegetation within a span of only three years. In the 2007 image, only the large

scale Dominion Farm project is visible while in the 2010 image an additional considerable proportion of the swamp's vegetation (denoted by yellow arrows) has been cleared by small-scale farmers.



Eugene Apindi Ochieng/UNEP

A herd of Topi in the shrubs and thickets of Hindi, Lamu County

to Japan and China in 2008—and increased from 11 696 in 2008 to 12 572 in February 2011 according to an aerial census carried out jointly by KWS and IFAW (KWS 2011).

### Actionable Policy Options

- Develop a comprehensive national biodiversity policy and enact a biodiversity law. The regulatory framework should essentially domesticate the provisions of CBD, CITES, the Ramsar Convention, and their relevant protocols. It should also provide for periodic inventorying and monitoring of the country’s biodiversity resources.

- Become a signatory to the Nagoya Protocol on Access to Genetic Resources and the Fair and Equitable Sharing of Benefits Arising from their Utilization to the Convention on Biological Diversity.
- Operationalize the Biosafety Act by gazetting its commencement date. The Biosafety law, which received presidential assent in 2009, has the potential to spur crop and livestock biotechnological innovation but also to ensure the containment of potentially dangerous GMOs.

## Forests and woodlands

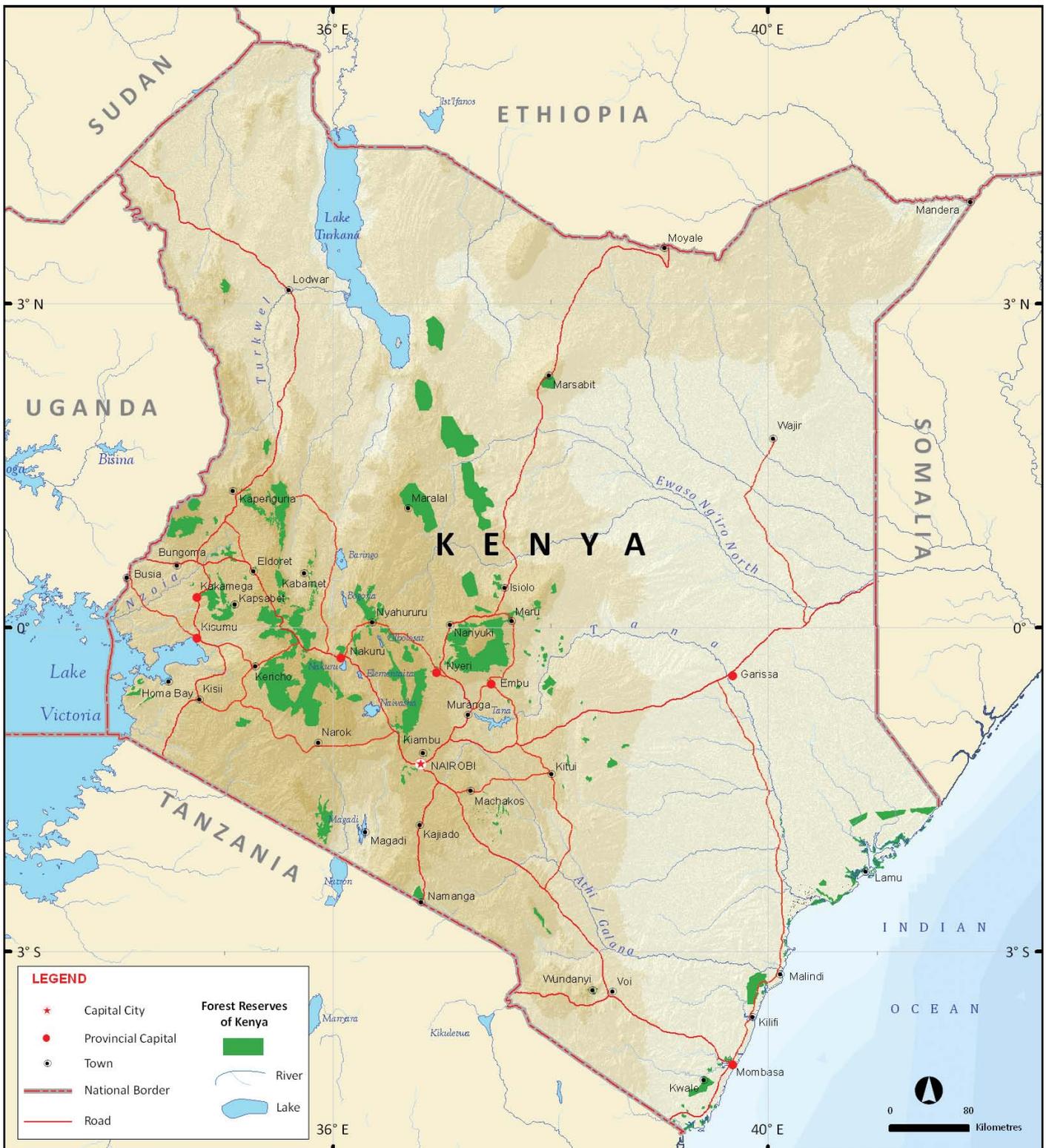
**Policy message:** Kenya’s forests and woodlands are a source of livelihood for the adjacent communities and sustain the agricultural, tourism, manufacturing and energy sectors. Their integrity is vital to the attainment of Vision 2030 and there is need to position the forests and woodlands as vital contributors to social and economic growth.

Kenya’s forest and woodland assets comprise 1.64 million ha of closed canopy forest, 610 000 ha of plantation forest (with both these categories being predominantly located in the central and Rift Valley highlands as well as the coastal region), 851 000 ha of rain forest (largely comprising the Kakamega Forest in Western Kenya) and 211 000 ha of dry zone forests (World Bank 2007). According to the stipulations of the 2005 Forests Act, there are three legal categories of forests in Kenya; state forests which are under the jurisdiction of the Kenya Forest Service (KFS), local authority forests which are

managed by the various local authorities and, private forests that are managed by their respective owners.

Kenya’s forests, which are depicted in Figure 8, provide forest-adjacent communities with food, wood fuel, housing materials, medicinal herbs and a site for reinforcing their cultural identities. Forests also provide a range of ecosystem goods and services. They are a storehouse of biodiversity as they are a habitat for upwards of 60 percent of the country’s indigenous flora and fauna, avifauna and herpetofauna species. Other ecological services that forests provide are water purification, groundwater recharge, soil erosion and siltation control, and flood mitigation. Forests also play a vital role in microclimate management by influencing the production of rainfall, halting the spread of deserts and sequestering carbon, effectively mitigating climate change.

In addition, Kenya’s five montane forests namely; the Mau Forest Complex, Mount Kenya, the Aberdare Ranges, Mount Elgon, and the Cherangani Hills, are also

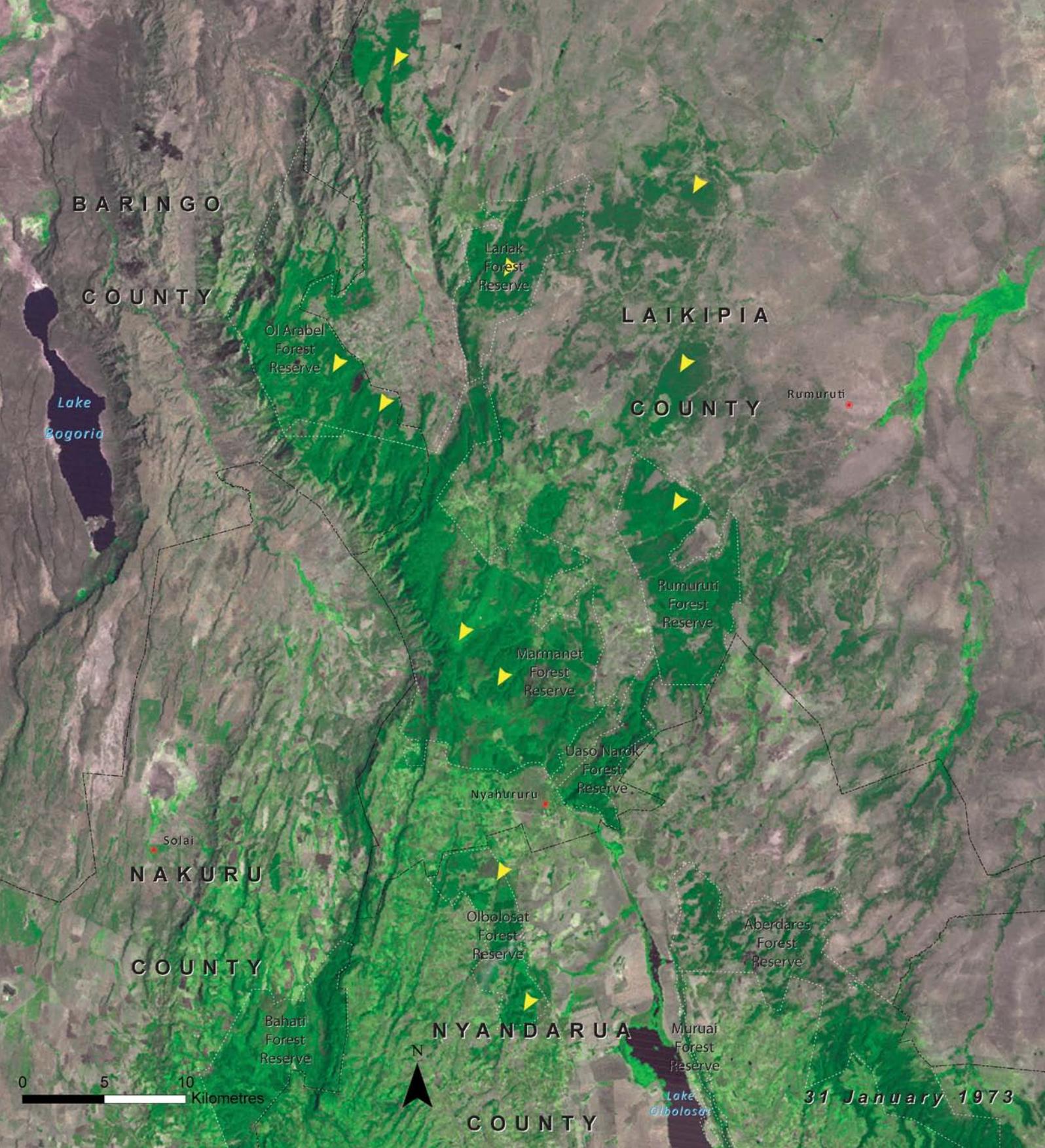


**Figure 8: Kenya's forest reserves**

KWS 2010

the country's water towers. This is because they form the upper catchments of nearly all the country's main rivers namely; the Tana, Chania, Thika, Ewaso Nyiro, Athi, Malewa, Nzoia, Yala, Nyando, Sondu, Mara, Turkwel and Malakisi rivers. Many of these rivers are the lifeblood of some of Kenya's main tourist destinations such as the Lake Nakuru National Park, Mount Elgon National Park, Mount Kenya National Park and Aberdare National Park as well as the Samburu and Maasai Mara National Reserves. The latter is considered to be the crown jewel of Kenya's wildlife parks owing to its high concentration

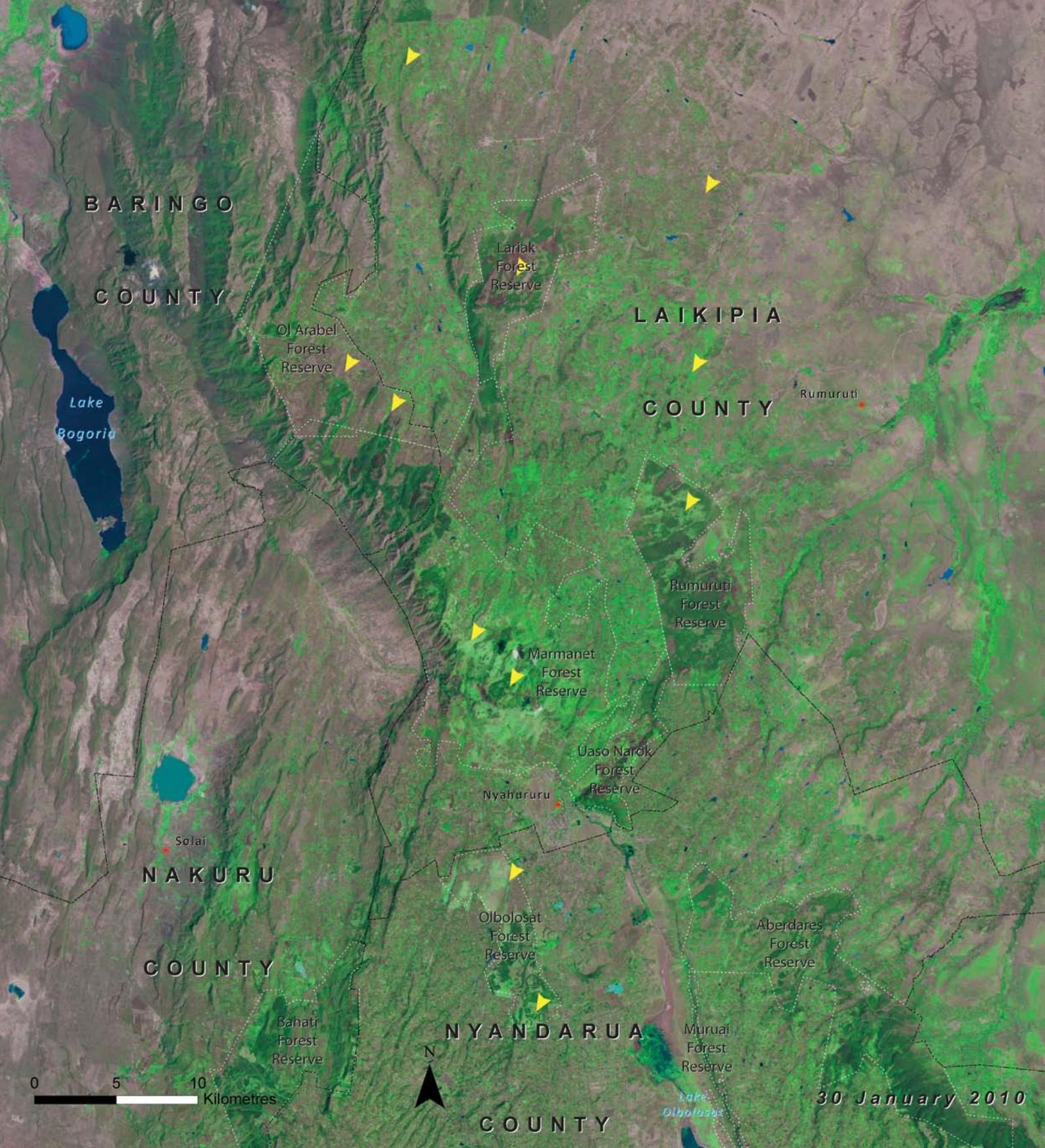
of the prized 'Big Five' (African lion, African elephant, rhino, buffalo and leopard) and its annual wildebeest migration spectacle that attracts large numbers of tourists, raking in substantial tourism income. These montane forests also constitute the main catchments of most of the country's lakes such as Victoria, Nakuru, Turkana, Baringo and Natron. In addition, they are sources of water for domestic, agricultural and industrial processes and hydro electric power generation and thereby implicitly support the attainment of Vision 2030.



Nicolas Rosty/Flickr.com

**FOREST LOSS:** Conversion of forested land to agricultural and other land uses has been a common occurrence in Kenya over several decades. This worrisome state of affairs is not only restricted to private land, but also to gazetted forests. Deforestation in Kenya is therefore both attributable to illegal activities by private actors and government sanctioned forest excisions.

*Elephants walking through the Aberdare forest*



In 1973, Ol Arabel, Lariak, Marmanet, Rumuruti, Aberdares, Olbolosat, Bahati, Uaso Narok, and Muruai forest reserves and their environs were covered with lush green forests as depicted in the 1973 image. However, in the 2010 image, most of the forests have been cleared, leaving behind farms and barren land (yellow arrows). With Vision 2030 aiming to eventually raise the country's forest cover to 10 percent, policies need to be put in place to encourage afforestation and reforestation

and to also discourage deforestation by making trees more valuable when standing than felled. Furthermore, there is need for enhanced protection of the existing forest resources.

**Policy message:** Stricter enforcement of the Forests Act (2005) is vital to remedying many of the problems which are responsible for Kenya's dismal forest cover of 1.7 percent (GoK 2009c), which is well below the government's stated goal of raising the forest cover to 10 percent by 2015 (GoK 2005) or even the lenient constitutional stipulation of attaining and maintaining a tree cover of 10 percent. Moreover, the country's paltry forest cover is significantly lower than the other African countries' average of 9.3 percent and the world's of 31 percent (FAO 2010).

A number of factors are responsible for Kenya's paltry tree cover and include illegal logging to meet timber and charcoal needs (with the latter an especially serious threat to the country's forests as the world continues to witness astronomical rises in crude oil prices), poverty that leads to overexploitation of forest resources, population pressure that occasions the clearing of forests for agricultural and residential purposes, poor enforcement of the longstanding countrywide logging ban and the decades' exclusion of forest-dependent communities from the management of the adjacent forests with the effect that they were disinclined to ensure their sustainable management.

There is need to intensify enforcement of the 2005 Forests Act by enhancing the capacity of Kenya Forest Service (KFS) to implement the logging ban. In addition, afforestation efforts particularly in the considerably degraded Mau Forest Complex need to be drastically scaled up.

Despite these admittedly enormous challenges, the forestry sector provides unique opportunities to help realize the poverty reduction aspirations set forth in

A Kenya Forest Service tree nursery next to Buda Forest in Kwale County



Vision 2030. Supporting the formation of Community Forest Associations (CFAs) in line with the stipulations of the 2005 Forests Act has the potential to provide innovative incentives for afforestation because, the CFAs are in return for protecting and conserving forests, entitled to a raft of user rights, such as collection of medicinal herbs, wood fuel and honey and establishment and management of ecotourism and recreational activities which can be important sources of income.

**Recommendation:** Kenya Forest Service's (KFS) capacity to effectively manage the state forests needs to be scaled up. Further, owing to the benefits accruing from participatory forestry management, there is urgent need to encourage the formation of CFAs by explaining the legal and policy framework as well as the attendant benefits and responsibilities to forest-adjacent communities.

The growing realization that forests' integrity is vital to effective climate change mitigation is raising the stature of a range of international forest-centric initiatives. For instance, REDD-plus was mooted as one of the ways of stemming deforestation by the Copenhagen Accord and is primed to become one of the main recipients of the Green Climate Fund elaborated on in the Cancun Agreements. Taking advantage of these initiatives can considerably lessen the government's burden of funding forest conservation.

**Recommendation:** Kenya should strategically position herself to tap a number of international forest-centric initiatives (such as the Green Climate Fund, CDM and REDD-plus) by establishing a robust forest governance structure. Once set up, the Green Climate Fund will be worth US\$ 100 billion dollars a year and Kenya should aim to be a recipient of a sizeable proportion of the fund. Further, capacity building in the intricacies of the Clean Development Mechanism (CDM), REDD-plus and the Green Climate Fund should be fast-tracked if Kenya is to benefit from the considerable technical and financial support under the evolving forest-centred climate change mitigation and adaptation initiatives.

## Actionable Policy Options

- Strengthen the capacity of the Kenya Forest Service to carry out a multi-stakeholder, multi-resource assessment of the country's forests, ensure sustainable use of the forest resources and enforce the logging ban.
- Encourage formation of community forest associations (CFAs) in line with the stipulations of the Forests Act and empower them to engage in sustainable forest management. CFAs should be representative of the communities that live adjacent the forests and include women and marginalized communities and have strict rules and procedures that prevent their appropriation by the dominant local groups (World Bank 2007).
- Step up reforestation of Kenya's larger forests in order to raise the country's abysmal 1.7 percent forest cover. Given the huge resources this would require, complementing command and control structures with scaled-up public-private partnerships (PPPs)—similar to the Rhino Ark-spearheaded Aberdare National Park fencing project—will be integral to rehabilitating the significantly degraded Mau Forest Complex.

- Enhance the capacity of government officials, institutions, NGOs, local communities and entrepreneurs to tap a range of well-funded forest-centered initiatives such as REDD-plus and the Green Climate Fund and the lucrative opportunities associated with carbon trading.
- Promote agro-forestry by disseminating the associated economic, environmental and cultural costs and benefits as well as by providing reliable extension services. Emphasis should be placed on encouraging propagation of indigenous tree species. Although these enrich tree species and are better able to withstand environmental shocks, they are considerably under-utilized in agro-forestry.
- Initiate a range of energy sector reforms that will impel investment in clean and affordable sources of renewable energy such as solar, wind and biogas and concomitantly ease the enormous pressure exerted on the country's diminishing forests and woodlands for wood fuels (Hammill et al 2005).

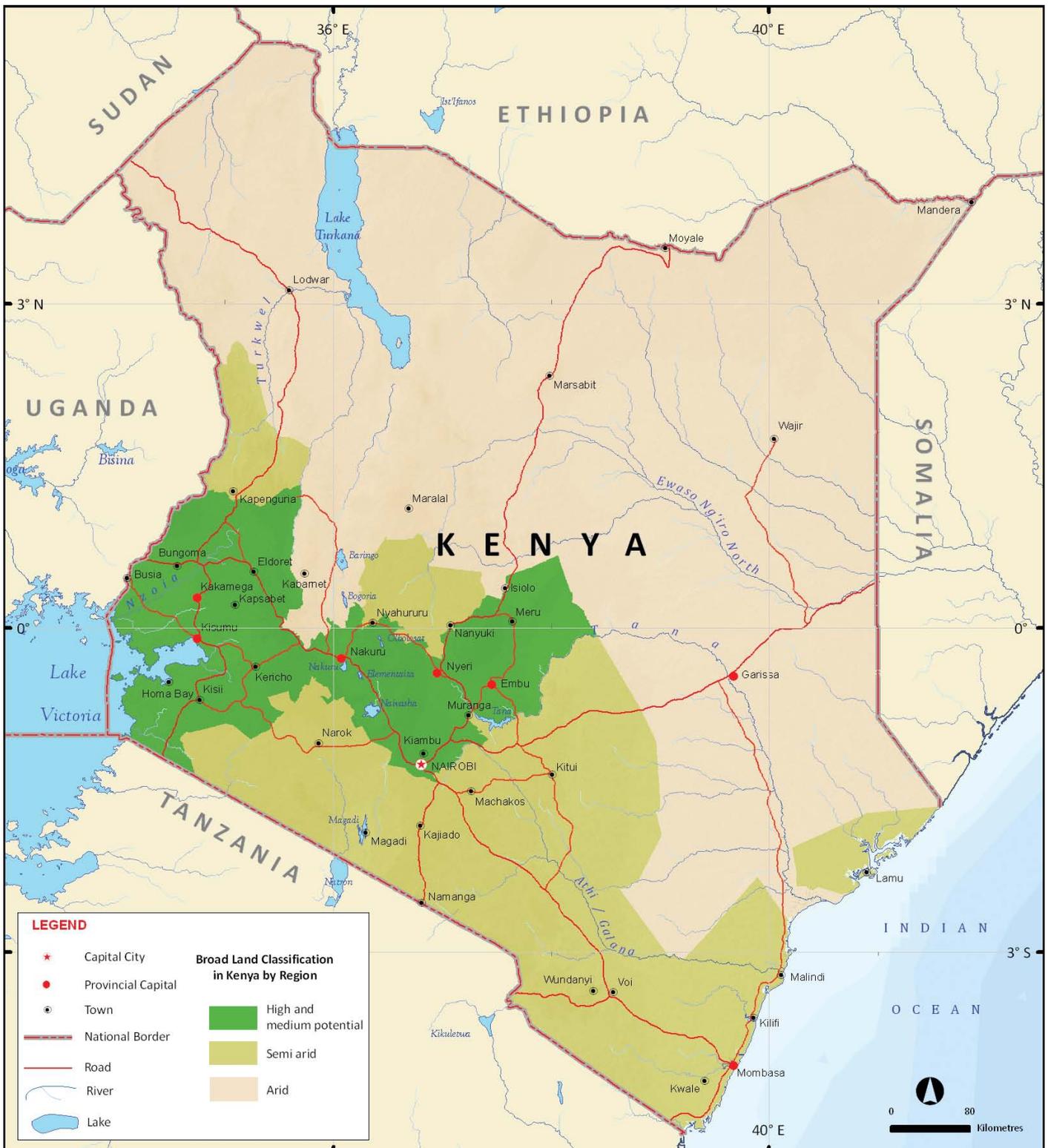
## Land, agriculture and livestock

**Policy message:** *Land is a critical productive asset and with so many livelihoods dependent on it in Kenya, it is vital to accomplishing the ideals outlined in Vision 2030. However, given that the overwhelming majority of the land in Kenya is classified as arid or semi-arid, it is critical that the enormous and peculiar challenges that these lands confront are effectively tackled. Kenyan policy-makers ought to give environmental governance in arid and semi-arid lands (ASALs) important consideration by encouraging the role of research and technology in this vast portion of the country.*

Land accounts for 98.1 percent of the Kenya's area of 582 728 sq km, with the remaining 1.9 percent comprising surface water. Land supports a range of terrestrial and subterranean natural resources such as water, air, soil and minerals; provides a habitat for faunal and floral species and buttresses a variety of ecosystem services.

It is also an important factor of production with this underlined by the fact that agriculture accounted for 23.5 percent of the country's GDP in 2009 and 21.5 percent in 2010 (GoK 2011). Secure land tenure and property rights impel agricultural, livestock and industrial production and are important drivers of the social and economic transformation as well as the political stability envisaged by Vision 2030.

Twenty percent of the country's landmass consists of medium to high potential arable land that undergirds the country's food and cash crop production with the remaining 80 percent being classified as arid or semi arid lands (ASALs) (GoK 2009b). Figure 9 contains an illustration of land classification in Kenya. An estimated 75 percent of the country's population lives on arable land and grows most of the crops as depicted in Figure 10, while the rest lives in the sparsely populated ASALs. However, ASALs support 70 percent of the national livestock population and 90 percent of the country's wildlife that, together with the country's diverse coastal resources, is the cornerstone of the country's thriving tourism industry (GoK 2004).



**Figure 9: Land classification in Kenya**

DRSRS 2010

**Policy message:** *Although the land provisions of the 2010 Constitution and the 2009 National Land Policy are important first steps to integrating land tenure and land use with sustainable management of the country's environment, a number of glaring legal vacuums, particularly on land use, need to be bridged.*

The land resource in Kenya is bedevilled by scarcity, ethnically-based and user-related conflict, and environmental degradation. These may be blamed on the colonial policy of large-scale land alienation for European settlement and the displacement of Africans into native reserves (Okoth-Ogendo 1991), inequitable distribution of land, the decades-old conspicuous absence of a national land policy, fragmented land laws, inadequate land titling and registration and ineffective dispute resolution mechanisms. The magnitude of these historical

injustices was epitomized by the fact that land reform was, in the wake of the 2008 post-election violence, identified by the Kenya National Dialogue and Reconciliation Committee as one of the issues that needed to be addressed in order to consolidate national unity and cohesion. This led to the finalization of the National Land Policy (GoK 2009b) and entrenchment of key provisions on land in the new Constitution promulgated in August 2010.

**Recommendation:** Enact and bring into force the National Land Commission Act and the land use law in accordance with the timelines detailed in the Constitution. These would pave the way for enactment of numerous laws that would ensure security of tenure, equitable access to land, sustainable management of land and transparent and cost-effective administration of land.

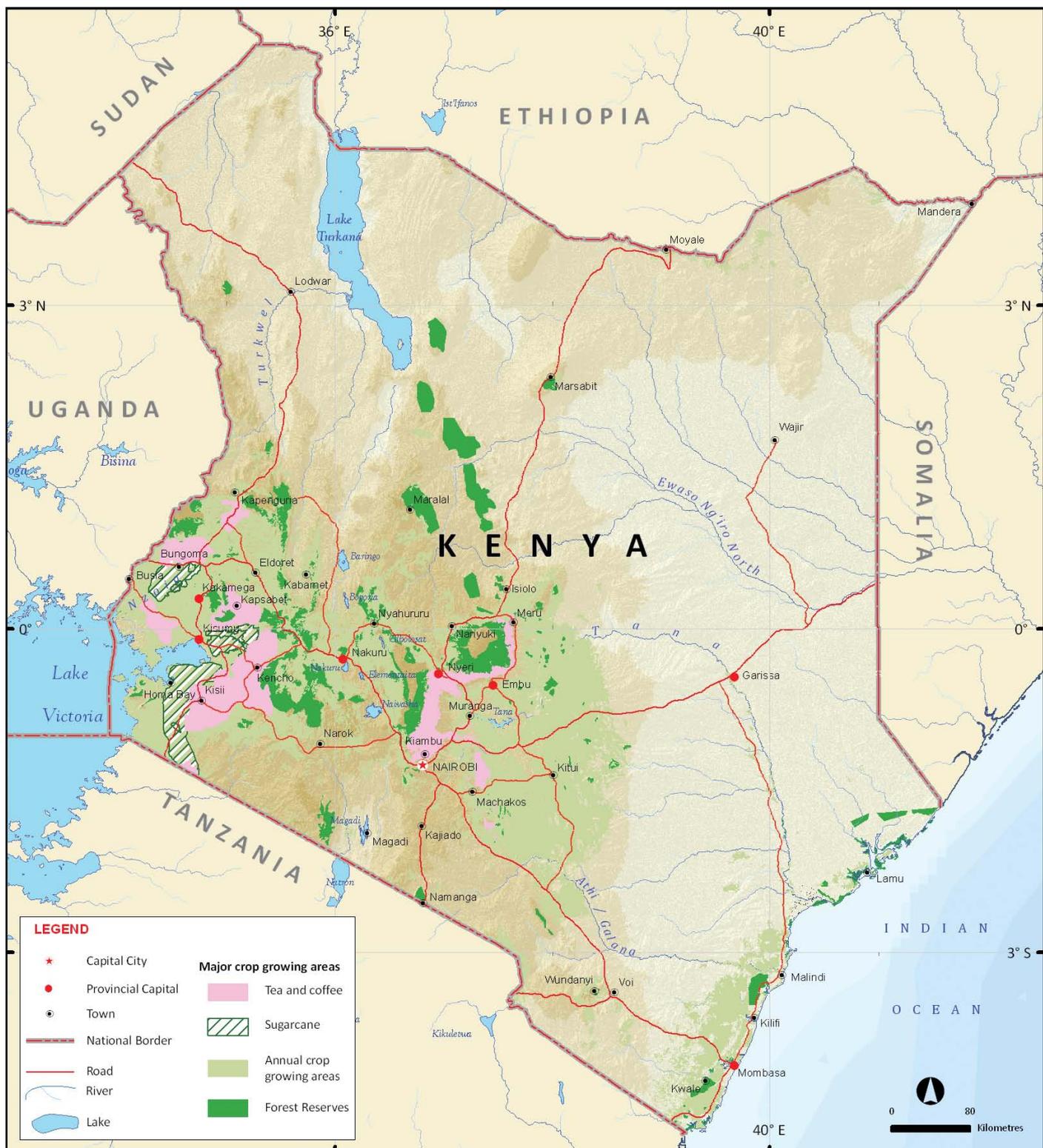
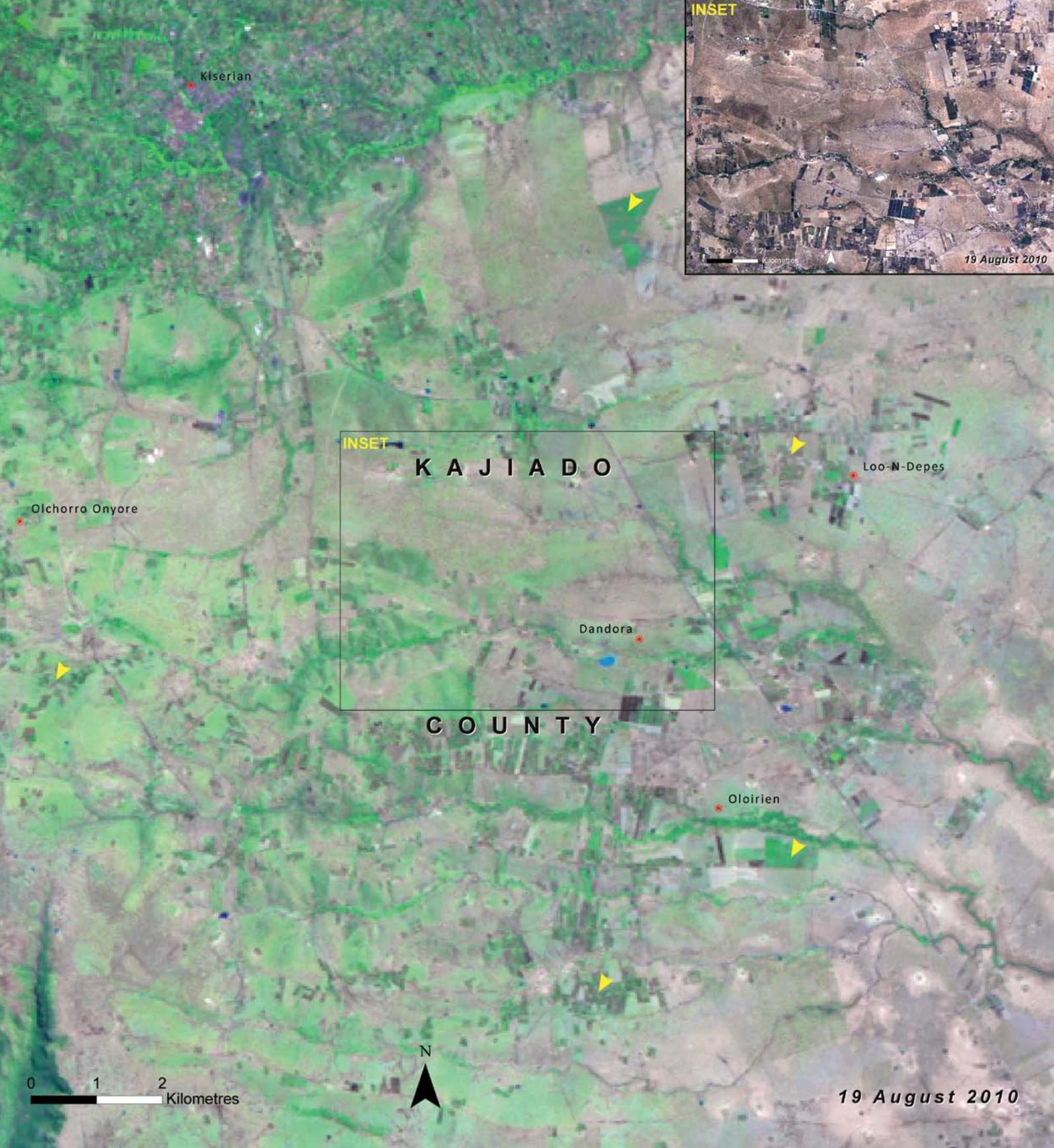


Figure 10: Kenya's major crop growing areas



**Greening Kajiado:** In the past, Kajiado County, located to the south of Nairobi City, formed one of the largest contiguous pastoral lands occupied mainly by the Maasai community in Kenya. The area's vegetation primarily consisted of grassland, shrubs, and thickets. Nomadic pastoralism—the traditional way of life of the Maasai—was the dominant land use.

*A Maasai father and son tend their cattle in a paddock in Kitengela*



Currently though, subdivision of this land and eventual change of ownership has resulted in a change in the vegetation characteristics and land use. As is evident from the above two images, within a span of 16 years (1984-2010), the vegetation changed from a brownish to a more lush, greener tone. This is because the new land owners are aggressively promoting

tree farming. The yellow arrows show those areas that have changed from barren to green.



Bruce Pengra/UNEP

A panoramic view of small-scale farms in the Rift Valley

Kenya's minority groups such as women, children and youth and marginalized communities such as pastoralists and forest-dependent communities quintessentially depend on land or land-based natural resources for their livelihoods and they often enjoy an inimitable spiritual and cultural bond with their ancestral lands. Gender-based inequitable access to land, for instance, implies that although women are the main producers of food in Kenya, they own a paltry 5 percent of the registered land in Kenya (Kenya Land Alliance 2004). Yet, because they don't have the wherewithal to assert their land rights, they are especially vulnerable to land grabbing, displacement, conflict, corruption and impoverishment and have witnessed systematic diminution of their lands.

**Policy message:** *The security of tenure accorded to women in the new Constitution needs to translate through to reality on the ground. Further, there is need to accord land rights to pastoral communities, informal settlement residents and other marginalized groups. These vulnerable segments of society also need to be trained on sustainable land and environment management particularly to reinforce sustainable production and consumption practices. It is anticipated that these groups would help to bring the Vision 2030 objectives to fruition and also ultimately benefit from the general welfare improvements delivered by the long-term development blueprint.*

### Actionable Policy Options

- Enact and bring into force the National Land Commission Act and the land use law in accordance with the timelines

detailed in the Constitution. These would pave the way for ensuring security of tenure, equitable access to land, sustainable management of land and transparent and cost-effective administration of land.

- Overhaul the Agriculture Act to bring it in line with liberalization realities, do away with its command and control orientation that has impeded agricultural production and optimal land use (Odhiambo and Nyangito 2002). The new regulatory framework should, in addition, institute mechanisms to ensure adherence to sound agricultural practices.
- Ensure that women and vulnerable groups have access to land and enjoy security of tenure by allocating them land in their own right and enforcing the Succession Act (Cap 160) which entrenches the right of a married woman to inherit her husband's property and accords women and men equal rights to inherit land and other property.
- Encourage the use of crop and livestock biotechnology as this has the potential to dramatically improve agricultural and livestock yields without requiring larger acreage. To ensure the containment of potentially harmful GMOs, the 2009 Biosafety Act should be declared operative so that it can regulate the thriving biotechnology sector.
- Expand the area under irrigation in order to reduce dependence on rain-fed agriculture. The National Irrigation Board (NIB) should develop low-cost and low-maintenance irrigation schemes and technologies in the ASALs which is where they are most needed.
- Encourage research and propagation of drought-resistant crops such as millet, sorghum and cassava in order to assure food security. This is particularly important given that climate change is likely to occasion an increasingly higher incidence of crop failure.

# Fresh water, coastal and marine resources

## Fresh water

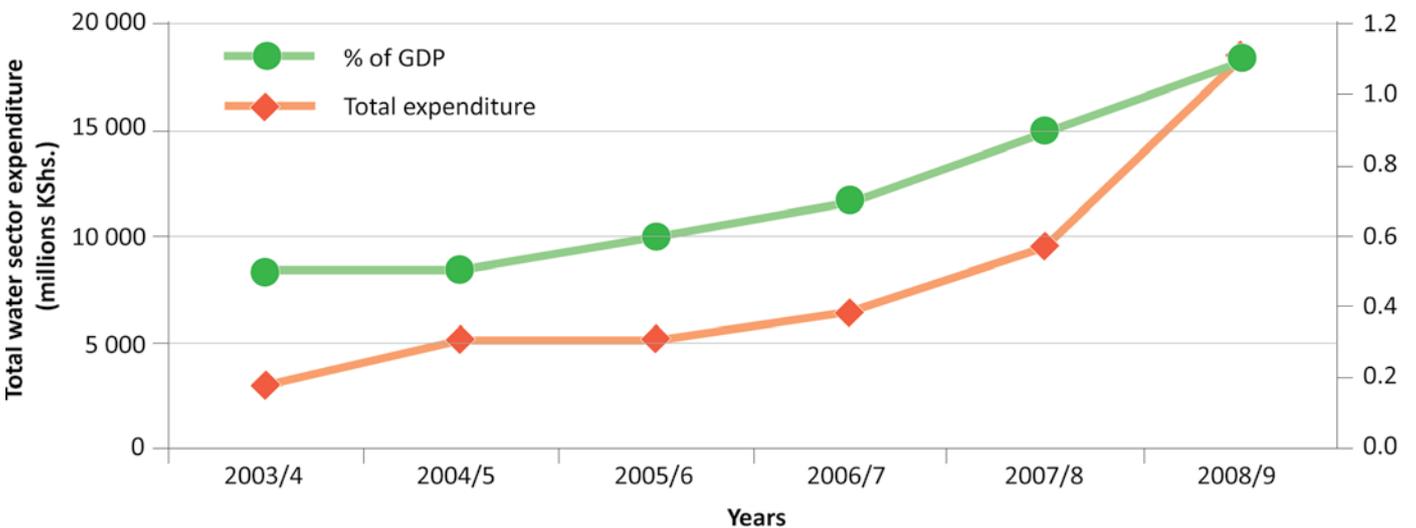
In Kenya, as elsewhere, water has multiple uses namely; nutritional, domestic, recreational, navigational, waste disposal and ecological as it is a habitat for living and non-living organisms. And, because it is indispensable to manufacturing, agriculture, fisheries, wildlife survival, tourism and hydroelectric power generation, it is a vital factor of production. Kenya’s freshwater endowments include surface waters, groundwater, and wetlands. Surface water bodies include lakes, rivers, swamps, springs, dams and water pans dispersed within the Tana, Athi, Ewaso Nyiro north, Rift Valley and Lake Victoria drainage basins. They occupy a combined area of 11 230 sq km which represents 1.9 percent of the country’s area (GoK 2010c). While areas that perennially receive low rainfall and runoff, notably those in the Ewaso Nyiro basin, are highly dependent on groundwater, it is also an important supplementary source of water for urban households particularly in Nairobi, Mombasa and Nakuru.

**Policy message:** Given the linkages between water and human and environmental health as well as the major sectors of the economy, access to clean and safe water in adequate quantities is a prerequisite for the attainment of Vision 2030. It is therefore vital that measures are urgently instituted to address the water scarcity challenge that the country is currently grappling with especially in light of the fact that this crisis is projected to rapidly worsen as population increases and climate change and their derivative effects take their toll.

Many of Kenya’s important water bodies such as Lake Victoria, the Mara River, Lake Turkana and Lake Natron (the former two are freshwater and the latter two saltwater bodies/courses) are transboundary, necessitating an integrated regional approach to managing them. In recognition of this, in 2010, Kenya, along with Uganda, Tanzania, Rwanda, Burundi and Ethiopia, signed the landmark Nile Cooperative Framework Agreement which seeks to ensure equitable and sustainable use of the waters of the Nile River Basin by the Nile Basin Countries. The challenge in the coming years will be to persuade the lower riparian countries of Sudan and Egypt to sign the agreement in order to ensure cohesive and environmentally sustainable efforts to utilizing the Nile River basin’s vast water and biodiversity resources.

**Recommendation:** Attempts have been made to ameliorate the acute water shortage through drilling more boreholes and constructing dams to harvest rainwater. In order to avail water for agricultural use, the National Irrigation Board should look beyond the existing Mwea, Ahero, Perkerra, Bunyala and West Kano irrigation schemes and encourage individuals particularly in the ASALs, to invest in low cost irrigation technology such as pedal pumps as these can enable them to tap the lucrative horticulture market.

Quick access to clean and safe water in sufficient quantities remains a challenge to many poor households in the country. This is primarily because demand for water outstrips the stock of renewable freshwater, with the



Kenya Audit Office Audited Appropriations Accounts (2003/4 – 2007/8); GoK 2009b; GoK Constituency Development Fund (CDF) Board  
**Figure 11: Water sector allocation as a percentage of GDP for the financial years 2003/4 – 2008/9**

corollary that Kenya suffers from water scarcity. Kenya's renewable fresh water per capita endowment is estimated at 21 billion m<sup>3</sup> which works out to 548 m<sup>3</sup> per capita per year. This is much lower than the comparable figures for Uganda and Tanzania which stand at 1 273 and 2 035 respectively (World Bank 2010) and is well below the widely accepted Falkenmark Water Stress Indicator that places the water scarcity threshold at 1 000 m<sup>3</sup> per capita per year (Falkenmark et al 1989). And the prognosis is bleak as it is projected that the per capita water endowment will plummet to 235 m<sup>3</sup> by 2020 (GoK 2010b), qualifying that state of affairs as 'acute water scarcity.'

Kenya's water scarcity is attributable to a number of factors. Because 80 percent of Kenya's landmass is classified as arid or semi arid, the country's natural endowment of fresh water is organically limited. The skewed geographic distribution of the water resources occasions an inequitable delivery of water to the various regions of the country. Further, a rapidly rising population and a concomitant increase in water demand, overexploitation, eutrophication, wetlands and the wider catchment degradation resulting in polluted water resources are liable for this pitiable state of affairs. Climate change which has often manifested itself in prolonged droughts is also exacerbating the water paucity. Moreover, even though the expenditure on water as a percentage of GDP is rising as illustrated by Figure 11, water infrastructural development has not kept pace with the rapid urbanization and residents of informal settlements such as Kibera, Korogocho, Kangemi, Kawangware and Mathare in Nairobi, Bangladesh, Mishomoroni and Tudor and in Mombasa and Nyalenda and Manyatta in Kisumu have to make do with poor quality, unreliable and exorbitantly priced water.

The country's water scarcity has a range of negative ramifications. It results in higher incidences of water-borne, water-related or sanitation-related diseases such as malaria, diarrhoea and skin infections (GoK 2009a). Water conflicts are also likely to heighten and food insecurity to be aggravated owing to the correlation between agricultural productivity and water abundance. And because women are the primary collectors, users and managers of water for domestic use, water scarcity disproportionately affects them because it is they who have to walk long distances, often all day, in search of water.

**Policy message:** Kenya faces a formidable set of challenges in the water sector which disproportionately affect women and the poor. At a strategic level, water scarcity threatens to undermine Kenya's coveted position as the regional economic giant and unless remedial measures are urgently instituted, it is envisaged that the country's industries will be enticed by the neighbouring countries' abundant water supplies and with them, cheaper and more reliable hydroelectric power. This will lead to higher levels of unemployment and make it harder for the government to deliver the higher standards of living promised by Vision 2030.

**Recommendation:** Ground the concept of integrated water resources management (IWRM) which takes cognizance of the multi-faceted nature of water problems and calls for comprehensive management of water resources based on an ecosystem approach and an appreciation of the needs of the diverse users and the broad range of potential impacts of water use. This is an especially useful notion given that some of the vital sources of the country's freshwater, such as Lake Victoria and the Mara River, are transboundary and the IWRM concept would help to foster targeted regional cooperation.

## Coastal and marine

Kenya's coastal and marine resources consist of mangroves, coastal riverine and terrestrial forests, seagrass beds, coral reefs and a kaleidoscope of other marine life, sand dunes and sandy beaches. The coastal forests provide food and spawning grounds for an array of flora and fauna species, are crucial to shoreline stabilization, provide wood fuel, building materials and mariculture sites to coastal populations and host sacred sites for the coastal communities. The country's coral reefs provide

**Table 2: Kenya's coastline at a glance**

NEMA 2009

Attribute	Quantity
Length of coastline	608 km
Exclusive Economic Zone	118 sq km
Number of marine Protected Areas (MPAs)	10
Average annual marine fish catch (wild catch and mariculture)	7 000 tonnes

**Policy message:** The importance of Kenya's diverse coastal and marine ecosystems that are home to an array of habitats and organisms is underscored by the fact that they support the flourishing tourism and shipping sectors. The efficiency of the latter is key to addressing the country's growing trade deficit. These resources and their knock-on effect on other sectors of the economy are poised to play a critical role in the delivery of Vision 2030.

a habitat for turtles, dugongs, whale sharks and protect the coastline—whose overview is contained in Table 2—from potentially destructive ocean waves while the extensive 12-species seagrass beds are an important habitat for rabbit fish, surgeon fish, parrot fish, shellfish and sea cucumbers and are foraging grounds for endangered species such as dugongs and turtles. The swathes of sandy beaches and sand dunes are critical to the survival of sea turtles as well as shore and migratory birds which use the beaches and dunes to nest and lay their eggs.

Coastal and marine resources also contribute to the economic development of the country through tourism, fisheries, shipping and port activities. Coastal tourism accounts for 68 percent of Kenya's tourism earnings and has a contagion effect on the country's transport, agriculture and entertainment industries. The Mombasa Port is one of the busiest along the Eastern

**Recommendation:** The government should begin to put in place mechanisms to cushion the country's fragile coastal and marine resources from the shocks that are expected to accompany the growth in potentially hazardous cargo throughput as commercial oil production in the Albertine basin in Uganda and possibly Eastern DRC commences and when the Lamu-Southern Sudan oil pipeline is operational. Construction of the Lamu port should also be preceded by an extensive environmental impact assessment and be informed by sound environmental imperatives.

Africa coast and plays a strategic role in the regional economy as a gateway to international markets and suppliers. So besides meeting the national bulk import

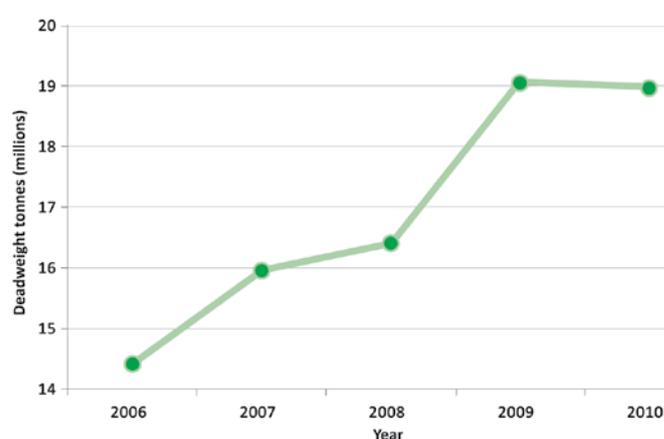


Figure 12: Trend of the amount of cargo handled by the Port of Mombasa

Table 3: Traffic handled at Mombasa Port, 2006-2010

Economic Survey 2011

	Unit	2006	2007	2008	2009	2010
Container Traffic	TEUs	479 355	585 367	615 733	618 816	695 600
Ships Docking	No	1 857	1 811	1 686	1 748	1 579
Imports	000'DWT	4 099	4 866	4 979	5 435	5 987
Dry General	"	2 344	2 722	2 891	4 641	3 871
Dry Bulk	"	5 043	5 474	5 441	6 432	6 386
Bulk Liquids	"					
Total Imports	"	11 846	13 062	13 311	16 508	16 244
Of which Transit In	"	3 473	4 042	4 471	4 612	5 004
Motor Vehicles landed	No.	65 348	73 818	87 284	95 798	95 604
Exports	000'DWT	1 810	2 102	2 295	2 220	2 410
Dry General	"	313	205	200	62	70
Dry Bulk	"	132	167	190	167	95
Bulk Liquids	"					
Total Exports	"	2 255	2 474	2 685	2 449	2 575
Of which Transit Out	"	335	381	404	368	377
Total Imports and Exports	"	14 101	15 536	15 996	18 957	18 819
Transshipment	"	318	426	419	105	158
<b>Grand Total</b>	<b>"</b>	<b>14 419</b>	<b>15 962</b>	<b>16 415</b>	<b>19 062</b>	<b>18 977</b>

and export needs, the port serves the landlocked Northern Corridor countries of Uganda, Rwanda, Burundi as well as Eastern Democratic Republic of Congo (DRC), Southern Sudan, northeast Tanzania and Somalia. The port's growing importance is borne out by the fact that its traffic throughput rose by 16.1 percent from 16.4 million tons in 2008 to 19.1 million tons in 2009. The throughput handled by the port in 2010 dropped marginally to 19 million tons (see Table 3 and Figure 12). The stature of the port is primed to grow in the foreseeable future as drilling for oil in Uganda will necessitate heavy equipment imports and exports of petroleum products. These opportunities will however be accompanied by significant environmental risks to Kenya's fragile coastal and marine resources. In the medium term, the importance of shipping to the economy and to the delivery of Vision 2030 is likely to grow once the US\$ 16 billion three-berth Lamu port—which is part of the Lamu Port Sudan and Ethiopia south transport corridor project (LAPSSET) and which will be able to handle the new generation larger and deeper New Panamax vessels, enabling Kenya to strategically position herself as a transshipment hub—becomes operational. The challenge will be to ensure that environmental safeguards to protect Lamu's fragile mangroves and fishing grounds during and after the port's construction are adhered to.

Despite Kenya's abounding and vital coastal and marine assets, a series of challenges continue to inhibit their sustainable development. These include climate change, marine pollution and poorly planned, ad hoc and uncoordinated coastal developments. The latter, which emanate from a sectorial approach to physical planning, culminate in the destruction of fragile ecosystems such as mangroves in order to pave way for salt harvesting and mariculture. Moreover, unpredictable, significant climatic events adversely impact biodiversity and are manifested through widespread coral bleaching and mangrove diebacks, general species loss and cause extensive damage to the coastal region's infrastructure. Land-based marine pollution particularly agricultural non-point source runoff, domestic, municipal and industrial waste, sludge from petroleum refineries at Changamwe and titanium mining in Kwale are of particular concern. Dumping of dredged substances, ballast water, sediments and other contaminated materials by ships also pose considerable threats to the country's coastal and marine resources. Overexploitation

of coastal and marine resources and the use of destructive fishing techniques are also responsible for the dwindling breadth of the country's marine resources.

**Policy message:** *A range of factors has contributed to the gradual deterioration of the country's coastal and marine resources and unless effective mechanisms are undertaken to address each of the factors enumerated above, the associated environmental, cultural and socio-economic impacts threaten to more than cancel out the benefits accruing from these unique resources. More research and monitoring are required to fill the knowledge gaps and adequately inform the management of the coastal zone resources.*

### Actionable Policy Options

- Instill the ethic of water harvesting at the household and community levels by offering a range of fiscal incentives on construction materials and prefabricated water tanks.
- Encourage public-private sector partnerships in water service provision, management, concessioning and capacity building at the grassroots level.
- Entrench the perception of water as an economic good which, if underpinned by the notion of cost recovery, would help to infuse business efficiency into water service management and concomitantly address water quality and environmental concerns (World Bank 1993, 2004 and IMF 2005). Of course, in line with the Mar del Plata Action Plan, Dublin Statement, MDG 7 and General Comment 15 of the UN Committee on Economic, Social and Cultural Rights which hold that access to water is a human right, there would be need to ensure that water pricing does not jeopardize the right of the poor to access the precious commodity.
- Ensure effective management of water catchment areas through harmonizing the policies on water, agriculture, wildlife, wetlands and forests as these activities and resources ultimately affect the quantity and quality of water available to the poorer segments of society.
- Institutionalize the concept of Integrated Coastal Zone Management (ICZM) and update the ICZM plans on a regular basis.

**Table 4: Kenya's progress on access to drinking water 1990-2008**

	Year	Population (thousands)	% Urban Population	Use of Drinking- Water Sources (% of Population)												Number of People who gained access to Improved Sources of drinking water 1990-2008 (thousands)
				Urban				Rural				Total				
				Improved			Unimproved	Improved			Unimproved	Improved			Unimproved	
				Total improved	Piped on premises	Over improved		Total improved	Piped on premises	Over improved		Total improved	Piped on premise	Over improved		
Kenya	1990	23 433	18	91	57	34	9	32	10	22	68	43	19	24	57	12 795
	2000	31 441	20	87	49	38	13	43	11	32	57	52	18	34	48	
	2008	38 765	22	83	44	39	17	52	12	40	48	59	19	40	41	

**Table 5: Kenya's progress on access to sanitation from 1990-2008**

	Year	Population (thousands)	% Urban Population	Use of of sanitation facilities (% of population)												Number of People who gained access to Improved sanitation 1990-2008 (thousand)
				Urban				Rural				Total				
				Improved	Unimproved			Improved	Unimproved			Improved	Unimproved			
					Shared	Unimproved facilities	Open Defecation		Shared	Unimproved facilities	Open Defecation		Shared	Unimproved facilities	Open Defecation	
Kenya	1990	23433	18	24	45	28	3	27	15	41	17	26	20	40	14	5 925
	2000	31441	20	26	48	23	3	30	16	36	18	29	22	34	15	
	2008	38765	22	27	51	20	2	32	18	32	18	31	25	29	15	

## Health and environment

**Policy Message:** *Although the interlinkages between health and environment are undeniable, relevant legal and policy interventions rarely take cognizance of this interconnectedness. Moreover health and environment agencies often function independently of each other and treat their mandates as though they were mutually exclusive.*

In tandem with the economic upturn that Kenya has generally enjoyed over the last decade, the country is witnessing soaring industrial activity. Technological innovation can undoubtedly improve economic and agricultural productivity and help surmount challenges that Kenya currently experiences in the health, water, sanitation and energy sectors, and in attaining gender equity (UNEP 2006). However, sustenance of the profit-driven industries has often entailed extensive exploitation of the country's land, forest, mineral, water, wildlife and marine resources and necessitated the large scale use of fossil fuels. The synergy of these has generated multifarious adverse impacts on the environment manifested through air, water, terrestrial and atmospheric pollution, a dramatic loss of biodiversity and a considerable

loss of ecosystems' integrity. Moreover, this severe environmental degradation has itself had dire consequences on the country's human and ecological health.

**Policy message:** *High population growth rates and unsustainable patterns of consumption and production have thrust the environment and health inter-linkages to the policy forefront. Unless these are reined in, they are likely to chain off a vicious cycle of successively severer environmental degradation and higher rates of morbidity which would ironically undermine the overarching objective of Vision 2030 to improve the lot of the majority of Kenyans. This is because both a healthy population and environment are indispensable to the attainment of the aspirations enumerated under the economic, political and social pillars of Vision 2030.*

The drivers of this vicious cycle of these environmental and health hazards include Kenya's exponential population growth, the increasingly acquisitive and ostentatious consumption patterns,

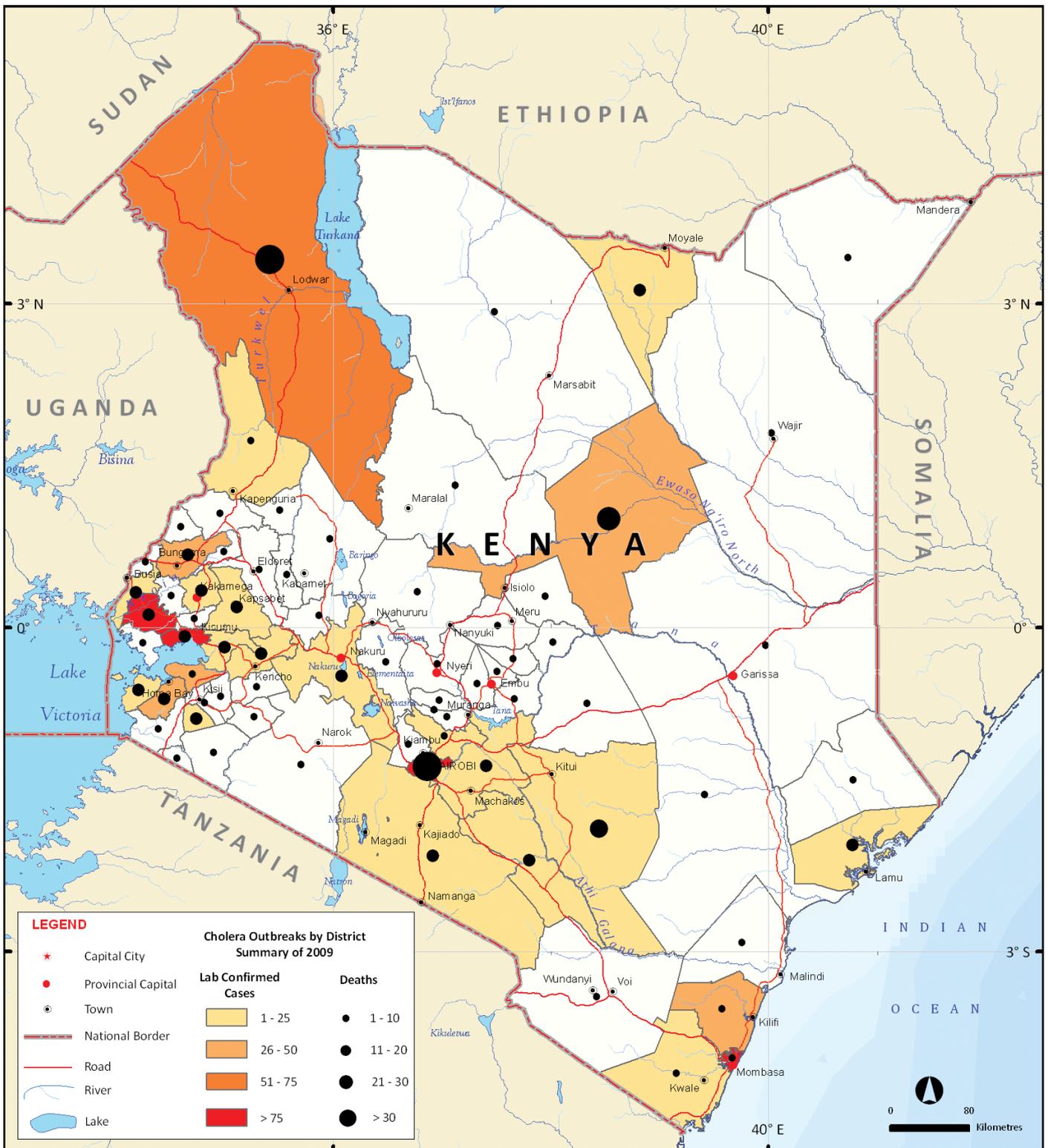


Figure 13: Cholera outbreaks by district, 2009

OCHA 2010

soaring rural-urban migration and rising, unplanned urbanization as well as the proliferation of informal settlements. These collectively exert enormous pressure on the country's natural resources and trigger a breakdown of the water, sewerage, waste disposal and transport infrastructure, leading to higher levels of water-borne and respiratory illnesses. To be sure, malaria, diarrhoea and respiratory illnesses were the leading causes of morbidity in 2008 (GoK 2009a). In addition, climate

change, which is primarily attributable to anthropogenic causes notably fossil fuel burning, cement manufacturing and deforestation (IPCC 2007), produces a series of severe and erratic climatic events such as frequent floods (which lead to increased incidence of water-borne diseases such as bilharzia and cholera). Figure 13 depicts the cholera outbreaks by district in 2009. Rising temperatures related to climate change contribute to the resurgence of malaria, yellow fever, trypanosomiasis and dengue fever.



*Unsanitary conditions in an unplanned settlement*

The legal provisions that aim to enhance human and environmental health are contained in a number of laws that range from the Environmental Management and Coordination Act, 1999, Water Act, Local Government Act, Public Health Act and Occupation Safety and Health Act and the applicable regulations which are reasonably exhaustive. However, lack of public awareness about the operative legal framework, light, non-deterrent monetary penalties, ineffective and inconsistent enforcement of these laws and lack of coordination among the authorities with an environment-health mandate such as NEMA, the

**Policy message:** *Stiffer penalties, better coordination among the agencies with a health and environment mandate and higher budgetary allocations to enable these agencies to strengthen their human resource and technological capacities will lead to better enforcement of the laws and regulations while greater public sensitization will lead to higher levels of voluntary compliance and a healthier population. The reduced healthcare burdens on both the households and government will enable the limited resources to be channelled to wealth creation activities and improvement of Kenyans' welfare, enabling the Vision 2030 goals to be met faster.*

Meteorological Department, Department of Environmental Sanitation and Hygiene, Integrated Disease Surveillance and Response Department (IDSR), National Disaster Operation Centre (NDOC), the Government Chemist and the Kenya Medical and Research Institute (KEMRI) continue to hamper the effective implementation of the legal and regulatory framework.

### **Actionable Policy Options**

- Sensitize regulatory officials, business leaders and the general public on the applicable health and environment legal and policy framework in order to both ensure strict enforcement of this framework and encourage voluntary compliance.
- Institute both incentives and command and control measures to ensure that industries that generate hazardous wastes, such as medical facilities, the petroleum refinery, depots and service stations, vehicle garages and electronics manufacturers and distributors dispose of them responsibly. Fiscal incentives should also be used to encourage investment in state-of-the-art incineration facilities that would ensure the complete destruction of the hazardous elements of the waste and prevent emission of toxic gases in line with the Third Schedule of the 2006 Environmental Management and Coordination (Waste Management) Regulations.

## Emerging issues

**Policy message:** *The novelty of identifying issues with potentially adverse environmental and human health consequences early on in their lifecycle lies with the fact that timely remedial measures can be instituted to thwart severe environmental degradation. Highlighting emerging issues will also gradually change the public misperception of the state of environment as static to where it is more accurately understood as a sequence of dynamic and continually interacting processes. This would help to prioritize environmental monitoring in order to recognize the initial symptoms of environmental stress at an embryonic stage.*

The criteria used for selecting the emerging issues for discussion are likelihood of persistence in the foreseeable future, potentially serious impacts on society and the propensity of effects to reverberate at the national level. The emerging issues that need to be addressed are the country's shifting demographics, hazardous wastes, invasive alien species, biotechnology, nuclear power, piracy, devolution and environmental justice.

- The SoE report is replete with concerns about Kenya's **shifting demographics** particularly the country's rapidly rising, younger and urbanizing population, whose synergy is placing tremendous pressure on the country's finite natural resources. Kenya's population stood at 38.6 million in 2009 and at the exponential 2.9 percent growth rate, it is estimated to stand at 40.9 million in 2011 and an astronomical 70.4 million in 2030.
- **Hazardous wastes** contain toxic content which have detrimental health and environmental effects. Up to 3 percent of the waste that is disposed of as solid waste in the Dandora dumpsite and in shallow pits in poor Nairobi neighbourhoods is hazardous medical, industrial or e-waste. And the problem is anticipated to worsen as economic growth leads to more affluence and as new urban centers mushroom in line with the devolution envisaged by the Constitution.
- Over the last six decades, Kenya has had to grapple with **34 invasive alien species**; 11 arthropods, ten microorganisms, nine plant species and four vertebrates (Kedera and Kuria 2005). Although strict phytosanitary

and sanitary filters have helped to stem the unintentional introduction of invasive species, some of the species that continue to pose considerable challenges to the country are the common carp (*Cyprinus carpio*), a freshwater fish and the water hyacinth (*Eichhornia crassipes*) which has choked off entire portions of lakes.

- The crux of the **biotechnology** debate is balancing the need to ratchet up agricultural production in order to assure food security and alleviate poverty against potential adverse effects of GMOs on health and biodiversity. In Kenya, biotechnology has been used to produce cultivars of banana, Irish potato, cassava, sweet potato, macadamia, strawberry, pyrethrum, sugarcane, vanilla and flowers (Olembo et al 2010) that are high-yielding, disease-resistant and less reliant on water and agrochemicals. Despite its potential, a number of challenges, such as the absence of a regulatory framework and of an oversight authority as well as biosafety concerns and untapped opportunities in livestock biotechnology need to be addressed.
- Kenya plans to commission her first 1 000 MW **nuclear power** plant by 2017 in order to diversify energy sources and lower energy costs. In light of the enormity of the Chernobyl and the Japan Fukushima nuclear disasters and plans by Germany to phase out nuclear energy—which accounts for 40 percent of that country's energy needs—by 2022, the country's Nuclear Electricity Project will need to satisfy itself and its public constituency that this and subsequent plants can operate safely, conform to the standards set by the International Atomic Energy Agency (IAEA) and can withstand natural disasters before it recommends this risk-fraught path to supposedly cheap energy.
- Increasingly brazen acts of **piracy** by Somali militia around the Gulf of Aden haven't just threatened international trade along one of the world's busiest maritime routes (Middleton 2008), they have a number of environmental ramifications. The absence of effective navy patrols has led to illegal tuna, shrimp, and lobster fishing by foreign trawlers and dumping of toxic waste off the Somali coastline (Middle East Online 2008) and possibly in Kenya's maritime waters, with potentially disastrous consequences for Kenyans' health as well as the country's coastal and marine resources.



Picture Taker 2/Flickr.com

*Mara sunrise*

- The Constitution entrenches the concept of **devolution**, mandating the nascent county governments to oversee a number of environmentally critical functions in agriculture (crop and animal husbandry, plant and animal disease control, and fisheries), health services, control of air and noise pollution, tourism, planning and development, soil and water conservation and forestry. Undoubtedly, once these governments are in place, they will have to surmount a steep learning curve and cooperation with the national government will be key.
- Even though **environmental justice** is implicitly provided for in the 1999 Environmental Management Coordination Act (EMCA), the 2008 Kipevu chemical spill, protestations over the environmental impacts of

Tiomin's titanium mining in Kwale, Ogiek claims to the Mau Forest Complex and the African Commission on Peoples and Human Rights' 2010 landmark ruling on the Endorois case have reignited debate about the practicality of the concept in Kenya. The Endorois case is particularly significant because, it epitomizes the recourse of marginalized groups to regional and international dispute resolution processes when they become frustrated with national ones. It also highlights the lack of awareness of environmental rights and responsibilities by practicing lawyers, the judiciary and general public. Clearly, without awareness of the environmental law provisions, it will be difficult for the country to attain Vision 2030 without compromising ecological integrity.

## Actionable Policy Options

- Scale up family planning interventions because population pressure has, in the preceding analysis, been held out as the single most culpable cause of environmental degradation in Kenya. For the population control measures to be successful, they would need to be complemented with a raft of measures that significantly lower infant mortality (and thereby eliminate the need to have many children as a kind of insurance) and those that demystify beliefs that measure a man's virility by the number of children he has.
- Formulate a hazardous waste policy and enact a law to act as a deterrent to hazardous waste importation and ensure the use of safe waste disposal methods. For this to be effective, the regulatory framework would need to entrench the 'polluter pays' principle. This would enable NEMA and other mandated agencies to devise a countrywide regime for identifying and safely handling hazardous wastes.
- Enhance the capacity of customs and immigration officials as well as police to detect and thwart importation of misleadingly labelled and packaged hazardous wastes. Further, improve the technical capacity of NEMA and other agencies to detect early release of hazardous wastes into the environment and to mitigate their deleterious effects.
- Avert the adverse economic and other impacts of invasive alien species by employing a two-pronged strategy consisting of prevention and mitigation. Training interception personnel to inventory and categorize invasive alien species as they emerge and to detect black listed species and, investing in modern inspection equipment, fumigation chambers to treat imported commodities and quarantining suspect cargo would help to thwart planned introductions while mitigation measures would revolve around eradication through mechanical, biological and chemical methods, containment and suppression (McNeely 2000) and sharing information and coordinating responses with neighbouring states (Genovesi and Shine 2004).
- Address public concerns about the dangers of biotechnology and GMOs by meticulously studying the topic and authoring journal articles that are then rigorously peer-reviewed. In addition, bringing the enacted Biosafety Act, 2009 into force would help to mitigate the risks associated with biotechnology.
- Rethink plans to venture into production of nuclear power in light of the severity of the Fukushima nuclear power disaster. Should the Nuclear Electricity Project Committee decide to proceed with nuclear energy generation given its potential to deliver substantial energy cost savings, it should proof the power plants against major earthquakes and tremors and if based at the coast, tsunamis. The committee should also ensure that there are adequate technological, financial and human resources to respond to a nuclear disaster.
- Forestall an environmental disaster from pirate-controlled vessels by coordinating international efforts to root out the vice as this would negatively affect the marine environment and the livelihoods of Kenya's marine artisanal fishermen.
- Ensure that the devolution of the environmental mandate to the county governments is carried out seamlessly and that the national government is on hand to provide guidance and technical support, and backstopping in the formative years.
- Prioritize and strengthen delivery of environmental justice and related rights namely; access to environmental information and public participation in decision-making on environmental issues. Indeed, the advantages of addressing systemic and attitudinal impediments to environmental justice, of providing environmental information and consulting the public widely before making environmental decisions are substantial.

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